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FRED

(FAST REFERENCE EMISSION DOCUMENT)

MARCH 1990

Ontario
Environment
Environnement
Jim Bradley, Minister/ministre

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FRED

(Fast Reference Emission Document)

Final Report

FALL 1989
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Emission Inventory Task Group
Air Resources Branch

MARCH 1990

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GENERAL

The Fast Reference Emission Document (FRED) is a compilation of data designed to provide a quick but comprehensive look at emissions of the main pollutants inventoried by various sources. It is to be noted that the data given in FRED are meant for MOE internal use only and some of the contents are tentative, not final information. FRED consists of four consecutive sections A, B, C and D for Ontario, Canada, the United States and North America, respectively. The data in each section are grouped under the subsections of historical trend, annual emissions, major sources and other emissions.

Due to limited availability and reliability of current emission data, emphasis is placed on SO2 and NOx emissions and on the two base years, 1980 and 1985. Complementary tables for VOC, CO and particulates are added for the base years only. Since emission data will be continually improved and revised by better inventory methodologies and/or more realistic data, a regular schedule of six months is planned to update the FRED tables.

FRED information was derived from different sources. Ontario data were extracted from MOE inventories and reporting systems while internal and tentative emissions provided by EPS were used for other provinces of Canada. Data from NAPAP tapes (Version 5 for 1980) and several EPA official reports (for 1985 and historical trends) were combined to obtain the US emissions. Details of the source references are given at the footnotes of each table.

Raw data for the compilation of Ontario inventories were obtained from Statistics Canada and several other public agencies. This information usually is available after a time lag of one to two years. Emission questionnaires have been sent to potential Ontario industrial sources for 1986 and 1987 and the outcome also depends on the return rate of the industries surveyed. Consequently, the information for the most recent period, 1986 to 1988, is strictly tentative, except for some major sources such as Ontario Hydro stations, Inco, Falconbridge, Algoma Steel, which reported their own official emission estimates.

While every effort was made to eliminate errors and verify the data represented in FRED, it still should be used with care and the references kept in mind. The emission inventory task group will keep FRED regularly updated and expanded with the most recent emission data where applicable.

SUMMARY LIST OF EMISSION TABLES FOR FAST REFERENCE

SECTION	COUNTRY PROVINCE	TABLE NUMBER	DESCRIPTION	CURRENT STATUS Year	Pollutant	SOURCES & REFERENCE	LATEST UPDATE
A	ONTARIO	A.1/SO2	Trend-Major SO2 Sources & Province Totals	80-88	SO2	- MOE	Sept. 89
		A.1/SO2HY	Ontario Hydro SO2 Trend	80-88	SO2	- MOE (from Ont. Hydro Reports)	August 89
		A.1/NOXHY	Ontario Hydro NOx Trend	80-88	NOx	- MOE (from Ont. Hydro Reports)	August 89
		A.2/85	Annual Emissions	1985	5 Major	- MOE	April 89
		A.2/86	by Major Sector	1986	pollutants	- MOE, tentative	Sept. 89
		A.2/87		1987		- MOE, tentative	Sept. 89
		A.3/SO2/85	Major SO2 Sources (10)	1985	SO2	- MOE	April 89
		A.3/NOX/85	Major NOx Sources (10)	1985	NOx	- MOE	April 89
		A.4/ALK/85	Ammonia, Alkaline Dust	1985	NH3, Alkal.	- MOE (EAG report)	August 89
B	CANADA	B.1/SO2	Emission Trend	70-85	SO2	- EPS, MOE	Sept. 89
		B.1/NOx	by Region & Province	70-85	NOx	- EPS, MOE	Sept. 89
		B.2/85	Annual Emission	1985	5 Major	- EPS, MOE	July 89
		B.2/80	by Region & Province	1980	pollutants	- EPS, MOE	Sept. 89
		B.3/SO2/85	Major SO2 Sources (10)	1985	SO2	- EPS, MOE	April 89
		B.3/SO2/80	Major SO2 Sources (10)	1980	SO2	- EPS, MOE	April 89
C	UNITED STATES	C.1/SO2	Emission Trend	80-85	SO2	- NAPAP sources	August 89
		C.1/NOx	by Region & State	80-85	NOx	- NAPAP & other EPA sources	August 89
		C.2/SO2/85	Annual Emission, Rank	1985	SO2	- NAPAP reports	July 89
		C.2/NOX/85	by Region & State	1985	NOx	- NAPAP reports	July 89
		C.2/VOC/85		1985	VOC	- NAPAP reports	July 89
		C.2/PART/85		1985	PART	- NAPAP reports	July 89
		C.2/CO/85		1985	CO	- NAPAP reports	July 89
		C.2/SO2/80	Annual Emission, Rank	1980	SO2	- NAPAP V.5	July 89
		C.2/NOX/80	by Region & State	1980	NOx	- NAPAP V.5	July 89
		C.2/VOC/80		1980	VOC	- NAPAP V.5	July 89
		C.2/PART/80		1980	PART	- NAPAP V.5	July 89
		C.2/CO/80		1980	CO	- NAPAP V.5	July 89
		C.3/SO2/85	Major SO2 Sources (50)	1985	SO2	- NEDS, major pt. report	August 89
		C.3/NOX/85	Major NOx Sources (50)	1985	NOx	- NEDS, major pt. report	August 89
D	NORTH AMERICA	D.1/SO2	Emission Trend	70-85	SO2	- NAPAP, EPA, EPS & MOE data	Sept. 89
		D.1/NOX	by EAST & WEST Region	70-85	NOx	- NAPAP, EPA, EPS & MOE data	Sept. 89
		D.2/SO2/85	Annual Emission, Rank	1985	SO2	- NAPAP, EPS & MOE data	August 89
		D.2/NOX/85	by Region & State/Prov.	1985	NOx	- NAPAP, EPS & MOE data	August 89
		D.2/VOC/85		1985	VOC	- NAPAP, EPS & MOE data	August 89
		D.2/PART/85		1985	PART	- NAPAP, EPS & MOE data	August 89
		D.2/CO/85		1985	CO	- NAPAP, EPS & MOE data	August 89
		D.3/SO2/85	Major SO2 Sources (50)	1985	SO2	- NEDS major points, EPS & MOE	August 89
		D.3/SO2/80	Major SO2 Sources (50)	1980	SO2	- NAPAP V.5, EPS & MOE data.	August 89

SECTION A : ONTARIO EMISSIONS

ESTIMATED EMISSION TREND OF MAJOR SULPHUR DIOXIDE SOURCES IN ONTARIO

(1,000 METRIC TONS)

EMITTERS	TYPE	LOCATION	1980	1981	1982	1983	1984	1985	1986	1987	1988
INCO	Copper & Nickel Smelter + IORP	Sudbury	812	723	328	459	683	695	635	659	658
FALCONBRIDGE	Nickel Smelter	Sudbury	123	114	61	79	84	74	90	72	60
ALGOMA STEEL	Iron Ore	Wawa	161	132	71	82	127	116	100	85	80
ONTARIO HYDRO	Utilities										
-Lambton		Courtright	150	154	152	171	145	118	96	105	90
-Nanticoke		Nanticoke	144	181	207	199	222	169	139	169	166
-Lakeview		Toronto	75	63	67	57	66	44	27	46	48
-Hearn		Toronto	16	6	7	1					
-Thunder Bay		Thunder Bay	10	9	9	9	10	5	6	8	10
-Keith		Windsor	0.9	4	6	1	1				
-Lennox		Bath	0.3	1	2						2
-Atikokan		Atikokan						1	2	4	5
		HYDRO TOTAL	396	418	450	438	444	337	270	332	321
Algoma Steel	Iron & Steel	Sault Ste Marrie	12	9	6	7	8	7	7	7 *	7 *
Stelco	Iron & Steel	Hamilton	16	10	7	7	11	7	7	7 *	7 *
Imperial Oil	Oil Refinery	Sarnia	23	27	25	23	25	20	22	26	26 *
Shell Oil	Oil Refinery	Sarnia	16	15	13	12	14	16	15	15	15 *
Pulp & Paper Industries			31	31	32 +	32 +	32 +	30	30 *	30 *	30 *
	Sub-Total		1,590	1,479	993	1,139	1,428	1,302	1,176	1,233	1,204
	Other sources		174	166	149	136	143	155	162	167	172
	PROVINCIAL TOTAL		1,764	1,645	1,142	1,275	1,571	1,457	1,338 @	1,400 @	1,376 @

Emission data for 1987 & 1988 are preliminary estimates and not final figures.

+ Estimated Values

@ tentative provincial total

* not updated

1980-1988 ONTARIO HYDRO SO2 EMISSION TREND

(Tonnes)

REGION	HYDRO STATION	1980	1981	1982	1983	1984	1985	1986	1987	1988
1	J.C.KEITH G.S.	851	3,960	6,330	923	815	0	0	0	0
1	LAMBTON G.S.	149,774	154,000	152,000	171,000	145,000	118,000	96,300	105,000	90,000
2	NANTICOKE G.S.	144,001	181,000	207,000	199,000	222,000	169,000	139,000	169,000	166,000
3	LAKEVIEW G.S.	75,080	63,199	67,000	56,600	66,400	43,800	26,500	45,700	48,300
3	R.L.HEARN G.S.	16,278	5,540	6,660	529	0	0	0	0	0
4	LENNOX G.S.	324	1,060	1,800	0	0	0	0	107	1,510
6	ATIKOKAN G.S.	0	0	0	0	0	1,040	1,590	4,060	5,130
6	THUNDER BAY G.S.	9,727	8,740	9,420	9,420	10,000	4,740	6,290	8,540	9,570
	ONTARIO HYDRO TOTAL	396,036	417,500	450,210	437,472	444,215	336,580	269,680	332,407	320,510

Source: Ontario Hydro Reports.

1980-1988 ONTARIO HYDRO NOx EMISSION(*) TREND

(Tonnes)

REGION	HYDRO STATION	1980	1981	1982	1983	1984	1985	1986	1987	1988
1	J.C.KEITH G.S.	215	1,058	2,142	337	307	0	0	0	0
1	LAMBTON G.S.	18,855	19,933	19,890	18,400	19,933	18,400	15,180	18,400	18,400
2	NANTICOKE G.S.	55,659	64,399	73,600	75,132	72,065	59,799	50,599	55,199	49,066
3	LAKEVIEW G.S.	19,775	18,396	19,890	19,933	18,400	13,646	7,973	14,260	16,866
3	R.L.HEARN G.S.	4,660	1,533	1,683	169	0	0	0	0	0
4	LENNOX G.S.	101	291	367	0	0	0	0	72	843
6	ATIKOKAN G.S.	0	0	0	0	0	445	767	1,687	2,760
6	THUNDER BAY G.S.	1,548	3,219	5,814	4,293	3,680	2,147	2,760	4,907	4,447
ONTARIO HYDRO TOTAL		100,813	108,829	123,386	118,263	114,385	94,437	77,279	94,525	92,382

* Note: NOx calculated as NO2.

Source: Ontario Hydro Reports.

MOE/ARB/AQM/EI - AUGUST 89

ONTARIO TOTAL EMISSIONS BY SECTOR

YEAR = 1985
(Tonnes/Year)

SECTOR	SO2	(%)	NOx	(%)	PART	(%)	CO	(%)	VOC (a)	(%)
Total Vehicles (b)	17,316	1.2%	280,372	47.9%	33,421	16.7%	2,100,458	68.8%	258,323	41.6%
Off-Highway Engines	3,335	0.2%	47,764	8.2%	4,269	2.1%	128,696	4.2%	23,248	3.7%
Railroad	2,241	0.2%	32,129	5.5%	1,521	0.8%	11,271	0.4%	2,375	0.4%
Aircrafts (c)	511	0.0%	10,110	1.7%	310	0.2%	37,845	1.2%	3,346	0.5%
Marine	6,531	0.4%	5,678	1.0%	486	0.2%	35,664	1.2%	11,145	1.8%
Residential	11,144	0.8%	15,352	2.6%	49,840	24.8%	199,267	6.5%	34,588	5.6%
Commercial	1,846	0.1%	7,727	1.3%	486	0.2%	1,222	0.0%	318	0.1%
Industrial	10,202	0.7%	4,576	0.8%	4,648	2.3%	673	0.0%	55	0.0%
Incineration	672	0.0%	2,730	0.5%	17,280	8.6%	53,616	1.8%	2,044	0.3%
Miscell/Fires(d)	0	0.0%	731	0.1%	6,125	3.1%	12,457	0.4%	198,881	32.0%
** AREA-SOURCE SUBTOTAL	53,797	3.7%	407,168	69.6%	118,385	59.0%	2,581,169	84.5%	534,321	86.1%
Electric Utilities	336,738	23.1%	94,600	16.2%	6,913	3.4%	3,314	0.1%	442	0.1%
Non-Fe Smelters	769,360	52.8%	4,914	0.8%	8,326	4.1%	143	0.0%	35	0.0%
Other Primary Metals	26,679	1.8%	14,198	2.4%	10,445	5.2%	205,223	6.7%	6,808	1.1%
Petroleum Refineries	60,362	4.1%	17,536	3.0%	3,368	1.7%	45,522	1.5%	16,058	2.6%
Pulp & Paper	29,610	2.0%	11,713	2.0%	25,043	12.5%	37,711	1.2%	6,200	1.0%
Chemicals	10,357	0.7%	14,386	2.5%	7,318	3.6%	121,118	4.0%	39,630	6.4%
Other Manufactures	34,367	2.4%	15,069	2.6%	15,098	7.5%	6,302	0.2%	16,443	2.6%
Mining & Ore processing	130,542	9.0%	1,189	0.2%	3,196	1.6%	47,535	1.6%	13	0.0%
Miscellaneous	5,246	0.4%	4,199	0.7%	2,587	1.3%	5,729	0.2%	786	0.1%
** POINT-SOURCE SUBTOTAL	1,403,260	96.3%	177,804	30.4%	82,294	41.0%	472,597	15.5%	86,417	13.9%
*** TOTAL	1,457,058	100.0%	584,972	100.0%	200,678	100.0%	3,053,765	100.0%	620,738	100.0%

Notes:

(a) Area: excluding emissions from landfills and natural sources.
Points: revised & updated Petro, chemical sectors from Levelton Reports.
(b) Transportation factors from Mobile 3 with updated 1985 Ontario data.
(c) Inflight emissions included.
(d) Particulates: excluding emissions from pesticde applications (85 EPS estimated: 52KT).

ONTARIO TOTAL EMISSIONS BY SECTOR

YEAR = 1986 (Tentative)
(Tonnes/Year)

SECTOR	SO2	(%)	NOx	(%)	PART	(%)	CO	(%)	VOC (a)	(%)
Total Vehicles (b)	17,742	1.3%	289,044	49.5%	34,563	8.3%	2,177,967	65.9%	267,849	40.6%
Off-Highway Engines	3,429	0.3%	48,038	8.2%	4,401	1.1%	143,582	4.3%	25,349	3.8%
Railroad	1,982	0.1%	28,421	4.9%	1,346	0.3%	9,970	0.3%	2,101	0.3%
Aircrafts (c)	696	0.1%	11,942	2.0%	450	0.1%	43,073	1.3%	5,437	0.8%
Marine	7,444	0.6%	8,365	1.4%	661	0.2%	38,099	1.2%	13,648	2.1%
Residential	10,864	0.8%	14,533	2.5%	23,439	5.6%	93,541	2.8%	16,325	2.5%
Commercial	1,691	0.1%	7,005	1.2%	458	0.1%	1,097	0.0%	289	0.0%
Industrial	14,982	1.1%	4,741	0.8%	7,002	1.7%	486	0.0%	42	0.0%
Incineration	690	0.1%	3,074	0.5%	18,165	4.4%	56,568	1.7%	4,759	0.7%
Miscell/Fires(d)	0	0.0%	7,131	1.2%	244,540	58.7%	267,749	8.1%	237,032	36.0%
** AREA-SOURCE SUBTOTAL	59,520	4.5%	422,296	72.4%	335,026	80.4%	2,832,133	85.7%	572,832	86.9%
Electric Utilities	269,838	20.2%	77,442	13.3%	6,444	1.5%	2,788	0.1%	373	0.1%
Non-Fe Smelters	725,000	54.3%	4,914	0.8%	8,326	2.0%	143	0.0%	35	0.0%
Other Primary Metals	26,049	2.0%	14,629	2.5%	10,052	2.4%	205,223	6.2%	6,808	1.0%
Petroleum Refineries	62,959	4.5%	17,027	3.0%	3,368	0.8%	45,523	1.4%	16,058	2.4%
Pulp & Paper	29,610	2.2%	11,713	2.0%	25,043	6.0%	37,711	1.1%	6,201	0.9%
Chemicals	10,357	0.8%	14,386	2.5%	7,318	1.8%	121,118	3.7%	39,631	6.0%
Other Manufactures	34,367	2.6%	15,070	2.6%	15,098	3.6%	6,302	0.2%	16,443	2.5%
Mining & Ore Processing	114,652	8.6%	1,189	0.2%	3,196	0.8%	47,535	1.4%	13	0.0%
Miscellaneous	5,246	0.4%	4,199	0.7%	2,586	0.6%	5,729	0.2%	786	0.1%
** POINT-SOURCE SUBTOTAL	1,278,079	95.5%	160,568	27.6%	81,431	19.6%	472,071	14.3%	86,348	13.1%
*** TOTAL	1,337,598	100.0%	582,864	100.0%	416,457	100.0%	3,304,204	100.0%	659,180	100.0%

Notes:

(a) Area: excluding emissions from landfills and natural sources.
Points: revised & updated Petro, chemical sectors from Levelton Reports (1985).
(b) Transportation factors (1985) from Mobile 3 with updated 1986 Ontario data.
(c) Inflight emissions included.
(d) Particulates: excluding emissions from pesticde applications (85 EPS estimated: 52KT).

ONTARIO TOTAL EMISSIONS BY SECTOR

YEAR = 1987 (Tentative)
(Tonnes/Year)

SECTOR	SO2	(%)	NOx	(%)	PART	(%)	CO	(%)	VOC (a)	(%)
Total Vehicles (b)	18,609	1.3%	301,964	49.6%	36,019	11.7%	2,267,769	69.3%	279,056	42.7%
Off-Highway Engines	3,528	0.3%	49,178	8.1%	4,588	1.5%	145,388	4.4%	26,329	4.0%
Railroad	2,042	0.1%	29,271	4.8%	1,386	0.5%	10,268	0.3%	2,164	0.3%
Aircrafts (c)	705	0.1%	12,005	2.0%	466	0.2%	43,303	1.3%	5,505	0.8%
Marine	9,451	0.7%	6,284	1.0%	628	0.2%	37,041	1.1%	13,117	2.0%
Residential	9,379	0.7%	13,823	2.3%	23,607	7.7%	94,354	2.9%	16,468	2.5%
Commercial	1,707	0.1%	5,850	1.0%	424	0.1%	911	0.0%	237	0.0%
Industrial	16,741	1.2%	6,183	1.0%	8,314	2.7%	757	0.0%	64	0.0%
Incineration	697	0.0%	3,108	0.5%	18,365	6.0%	57,191	1.7%	4,812	0.7%
Miscell/Fires(d)	0	0.0%	4,035	0.7%	129,022	42.1%	144,152	4.4%	218,551	33.5%
** AREA-SOURCE SUBTOTAL	62,859	4.5%	431,702	70.9%	222,820	72.6%	2,801,133	85.6%	566,302	86.8%
Electric Utilities	332,565	23.8%	94,688	15.5%	8,921	2.9%	3,630	0.1%	484	0.1%
Non-Fe Smelters	730,548	52.2%	4,914	0.8%	8,326	2.7%	143	0.0%	35	0.0%
Other Primary Metals	26,049	1.9%	14,629	2.4%	10,052	3.3%	205,223	6.3%	6,808	1.0%
Petroleum Refineries	68,552	4.9%	16,561	2.7%	3,368	1.1%	45,523	1.4%	16,058	2.5%
Pulp & Paper	29,610	2.1%	11,713	1.9%	25,043	8.2%	37,711	1.2%	6,201	0.9%
Chemicals	10,357	0.7%	14,386	2.4%	7,318	2.4%	121,118	3.7%	39,631	6.1%
Other Manufactures	34,367	2.5%	15,070	2.5%	15,098	4.9%	6,302	0.2%	16,443	2.5%
Mining & Ore Processing	99,652	7.1%	1,189	0.2%	3,196	1.0%	47,536	1.5%	13	0.0%
Miscellaneous	5,246	0.4%	4,199	0.7%	2,586	0.8%	5,729	0.2%	786	0.1%
** POINT-SOURCE SUBTOTAL	1,336,947	95.5%	177,349	29.1%	83,908	27.4%	472,915	14.4%	86,459	13.2%
*** TOTAL	1,399,805	100.0%	609,051	100.0%	306,728	100.0%	3,274,048	100.0%	652,762	100.0%

Notes:

(a) Area: excluding emissions from landfills and natural sources.
Points: revised & updated Petro, chemical sectors from Levelton Reports(1985).
(b) Transportation factors (1985) from Mobile 3 with updated 1987 Ontario data.
(c) Inflight emissions included.
(d) Particulates: excluding emissions from pesticde applications (85 EPS estimated: 52KT).

1985 ONTARIO EMISSIONS - MAJOR POINT SOURCES

POLLUTANT: SO2

Rank	SOURCE NAME	CITY	(Tonnes)	Ontario Percent
1	INCO	SUDBURY	695,000	47.7%
2	NANTICOKE G.S.	NANTICOKE	169,000	11.6%
3	LAMBTON G.S.	COURTRIGHT	118,000	8.1%
4	ALGOMA ORE DIV.-WAWA	WAWA	115,890	8.0%
5	FALCONBRIDGE	FALCONBRIDGE	74,352	5.1%
6	LAKEVIEW G.S.	MISSISSAUGA	43,800	3.0%
7	IMPERIAL OIL	SARNIA	19,595	1.3%
8	SHELL CAN (CORUNNA)	CORUNNA	16,103	1.1%
9	LAKE ONTARIO CEMENT	PICTON	7,748	0.5%
10	ALGOMA STEEL CORP.	S. STE MARIE	7,419	0.5%
	TOTAL OF 10 MAJOR SOURCES :		1,266,907	86.9%

*** Ontario provincial total = 1,457,058

1985 ONTARIO EMISSIONS - MAJOR POINT SOURCES

POLLUTANT: NOx

Rank	SOURCE NAME	CITY	(Tonnes)	Ontario Percent
1	NANTICOKE G.S.	NANTICOKE	59,799	10.2%
2	LAMBTON G.S.	COURTRIGHT	18,400	3.1%
3	LAKEVIEW G.S.	MISSISSAUGA	13,646	2.3%
4	STELCO	HAMILTON	5,568	1.0%
5	PETROSAR LTD	CORUNNA	5,525	0.9%
6	INCO	SUDBURY	4,893	0.8%
7	ESSO CHEMICALS	SARNIA	3,992	0.7%
8	IMPERIAL OIL	SARNIA	3,629	0.6%
9	ALGOMA STEEL CORP.	S. STE MARIE	3,207	0.5%
10	DOW CHEMICAL	SARNIA	3,080	0.5%
	TOTAL OF 10 MAJOR SOURCES :		121,738	20.8%

*** Ontario provincial total = 584,972

1985 AMMONIA & ALKALINE DUST EMISSIONS IN ONTARIO

POLLUTANT	CATEGORY	Tonnes	Percent
AMMONIA			
Natural Sources	Soils	52,954	46.5
	Amimal Waste	10,418	9.2
	Forest Fires	3	0.0
	Human Breath	50	0.0
	Subtotal:	63,425	55.7
Anthropogenic Area Sources	Combustion	537	0.5
	Incineration	37	0.0
	Livestock Management	33,208	29.2
	Fertilizer Application	1,705	1.5
	Cigarette Smoking	2	0.0
	Subtotal:	35,489	31.2
Anthropogenic Point Sources	Industrial	14,781	13.0
	Incineration	78	0.1
	Subtotal:	14,859	13.1
	AMMONIA TOTAL:	113,773	100.0
ALKALINE DUST			
Natural Sources	Soils	60,789	3.9
	Forest Fires	2	0.0
	Subtotal:	60,791	3.9
Anthropogenic Area Sources	Combustion	1,214	0.1
	Transportion	118	0.0
	Open Sources(a)	1,466,491	93.2
	Open Burning	<1	0.0
	Subtotal:	1,467,823	93.3
Anthropogenic Point Sources	Industrial	43,090	2.7
	Combustion	<1	0.0
	Incineration	1,037	0.1
	Subtotal:	44,127	2.8
	ALKALINE DUST TOTAL:	1,572,741	100.0

(a) Open Sources: including paved and unpaved roads.

SECTION B : CANADA EMISSIONS

1970 - 1985 CANADA SO2 EMISSION TREND

(1,000 Tonnes)

PROVINCE	1970	1972	1974	1976	1978	1980	1981	1982	1983	1984	1985
NEWFOUNDLAND	54	40	68	53	53	56	41	42	36	38	43
P.E.ISLAND	9	10	10	9	6	5	3	3	2	2	2
NOVA SCOTIA	144	163	170	171	175	193	193	179	175	201	170
NEW BRUNSWICK	133	178	152	162	191	220	221	206	172	162	138
QUEBEC	1,309	1,351	1,335	1,145	1,131	1,098	1,051	886	792	737	693
ONTARIO	3,226	2,674	2,315	2,227	1,594	1,764	1,645	1,142	1,275	1,571	1,457
MANITOBA	760	718	714	590	485	484	421	362	408	466	469
EASTERN TOTAL	5,636	5,135	4,763	4,357	3,635	3,819	3,574	2,821	2,861	3,176	2,972
SASKATCHEWAN	56	52	55	53	63	55	56	82	97	111	86
ALBERTA	624	757	656	536	551	600	543	504	513	517	539
BRITISH COLUMBIA	359	428	404	371	254	167	163	157	152	148	106
NW TERRITORY/YUKON	2	3	3	3	3	2	2	2	2	2	2
WESTERN TOTAL	1,041	1,240	1,118	963	871	823	764	744	764	778	732
CANADA TOTAL	6,677	6,375	5,881	5,320	4,506	4,642	4,338	3,566	3,625	3,954	3,704

Sources: - Ontario: MOE data (80-85), EPS data (70-78).
- Other provinces: EPS 1985 data as of Feb. 89, other years as of May 87.

1970 - 1985 CANADA NOX EMISSION(*) TREND

(1,000 Tonnes)

PROVINCE	1970	1972	1974	1976	1978	1980	1981	1982	1983	1984	1985
NEWFOUNDLAND	27	27	37	31	30	36	35	34	33	33	35
P.E.ISLAND	6	6	8	8	7	7	6	6	6	6	6
NOVA SCOTIA	56	65	71	81	70	36	67	71	73	76	78
NEW BRUNSWICK	39	48	50	53	62	58	56	52	48	49	46
QUEBEC	259	306	345	323	349	331	298	272	263	257	240
ONTARIO	425	485	507	526	572	565	566	575	557	580	585
MANITOBA	61	68	79	81	81	80	78	75	79	76	85
EASTERN TOTAL	872	1,005	1,097	1,103	1,172	1,162	1,106	1,086	1,059	1,076	1,075
SASKATCHEWAN	95	105	132	126	148	125	114	134	134	150	158
ALBERTA	225	264	311	305	372	430	421	413	408	415	447
BRITISH COLUMBIA	155	179	216	206	192	225	214	235	239	243	263
NW TERRITORY/YUKON	14	35	17	67	26	15	16	16	16	16	16
WESTERN TOTAL	489	583	677	705	738	795	765	798	797	824	885
CANADA TOTAL	1,361	1,588	1,774	1,808	1,910	1,957	1,872	1,884	1,856	1,901	1,960

(*) Notes: - expressed as NO2
- excludes forest fire emissions.

Sources: - Ontario: MOE data (80-85), EPS data (70-78).
- Other provinces: EPS 1985 data as of Feb. 89, 70-84 EPS data as of May 87.

1985 CANADA EMISSIONS

(1,000 Tonnes)

PROVINCE	SO2	NOx	CO	VOC	PART
NEWFOUNDLAND	43	35	198	36	124
P.E.ISLAND	2	6	64	11	10
NOVA SCOTIA	170	78	299	54	74
NEW BRUNSWICK	138	46	288	46	94
QUEBEC	693	240	1,915	359	323
ONTARIO	1,457	585	3,054	621	201
MANITOBA	469	85	431	68	73
EASTERN TOTAL	2,972	1,075	6,248	1,194	900
SASKATCHEWAN	86	158	644	80	173
ALBERTA	539	447	1,277	228	252
BRITISH COLUMBIA	106	263	2,377	289	423
NW TERRITORY	2	14	33	5	4
YUKON	0	2	13	2	7
WESTERN TOTAL	733	885	4,344	604	859
CANADA TOTAL	3,705	1,959	10,592	1,797	1,758

Sources: - Ontario: MOE data.
- Other provinces: EPS 1985 data, July 89.

1980 CANADA EMISSIONS

(1,000 Tonnes)

PROVINCE	SO2	NOx(a)	CO	HC	PART(b)
NEWFOUNDLAND	56	36	179	27	5
P.E.ISLAND	5	7	53	6	1
NOVA SCOTIA	193	86	357	71	8
NEW BRUNSWICK	220	58	316	50	16
QUEBEC	1,098	331	2,187	379	98
ONTARIO	1,764	565	3,381	705	1,231
MANITOBA	484	80	1,455	216	905
EASTERN TOTAL	3,819	1,162	7,927	1,454	2,264
SASKATCHEWAN	55	125	3,062	465	2,241
ALBERTA	599	430	2,744	655	1,542
BRITISH COLUMBIA	167	225	2,000	285	198
NW TERRITORY / YUKON	2	15	2,413	360	2,220
WESTERN TOTAL	823	795	10,219	1,766	6,201
CANADA TOTAL	4,642	1,957	18,146	3,221	8,465

Sources: - Ontario: MOE data.
- Other provinces: EPS 1980 data.
- (a) excludes fire emissions.
- (b) excludes open sources (agricutural tilling, unpaved roads etc.).

MAJOR SO2 POINT SOURCES IN CANADA - 1985

Rank	PROVINCE	SOURCE NAME	(Tonnes)	CANADA Percent
1	ONTARIO	INCO	695,000	18.8%
2	QUEBEC	NORANDA	436,000	11.8%
3	MANITOBA	HUDSON BAY M&S	270,000	7.3%
4	MANITOBA	INCO	188,000	5.1%
5	ONTARIO	NANTICOKE G.S.	169,000	4.6%
6	ONTARIO	LAMBTON G.S.	118,000	3.2%
7	ONTARIO	ALGOMA ORE DIV.-WAWA	115,890	3.1%
8	NOVA SCOTIA	LINGAN	85,000	2.3%
9	ONTARIO	FALCONBRIDGE	74,352	2.0%
10	ONTARIO	LAKEVIEW G.S.	43,800	1.2%
	TOTAL OF 10 MAJOR SOURCES :		2,195,042	59.2%

*** CANADA TOTAL: 3,705,000

SOURCES:
- Ontario: MOE
- Other provinces: EPS, preliminary estimates, April 1988

MAJOR S02 POINT SOURCES IN CANADA - 1980

Rank	PROVINCE	SOURCE NAME	(Tonnes)	CANADA Percent
1	ONTARIO	INCO	812,118	17.5%
2	QUEBEC	NORANDA	549,000	11.8%
3	MANITOBA	HUDSON BAY M&S	248,387	5.4%
4	MANITOBA	INCO	219,000	4.7%
5	ONTARIO	ALGOMA ORE DIV.-WAWA	160,583	3.5%
6	ONTARIO	LAMBTON G.S.	149,774	3.2%
7	ONTARIO	NANTICOKE G.S.	144,000	3.1%
8	ONTARIO	FALCONBRIDGE	123,333	2.7%
9	QUEBEC	GASPE	90,000	1.9%
10	ONTARIO	LAKEVIEW G.S.	75,080	1.6%
	TOTAL OF 10 MAJOR SOURCES :		2,571,275	55.4%

*** CANADA TOTAL: 4,642,000

SOURCES: - Ontario: MOE
- Other provinces: EPS, Revised April, 1988.

SECTION C : UNITED STATES EMISSIONS

1980-1985 SO2 EMISSION TREND IN THE UNITED STATES

EASTERN REGION
(1,000 Tonnes)

EASTERN STATES	1980	1981	1982	1983	1984	1985	85-80 VARI.(%)
ALABAMA	778	770	616	695	714	654	-16.0%
ARKANSAS	79	95	95	109	113	99	25.7%
CONNECTICUT	58	55	68	75	79	79	37.3%
DELAWARE	113	124	110	120	113	107	-5.7%
DIST. COLUMBIA	14	13	12	12	14	7	-51.7%
FLORIDA	1,000	1,009	915	843	818	602	-39.8%
GEORGIA	816	894	840	860	952	1,008	23.5%
ILLINOIS	1,328	1,261	1,275	1,352	1,313	1,268	-4.5%
INDIANA	1,788	1,674	1,513	1,579	1,764	1,691	-5.4%
IOWA	303	274	268	257	273	263	-13.3%
KENTUCKY	1,043	1,085	994	818	765	798	-23.5%
LOUISIANA	364	306	302	279	303	365	0.3%
MAINE	121	103	102	81	84	72	-40.6%
MARYLAND	275	248	249	254	289	279	1.3%
MASSACHUSETTS	325	310	308	274	281	298	-8.3%
MICHIGAN	763	826	786	783	790	500	-34.5%
MINNESOTA	217	200	178	160	171	159	-26.8%
MISSISSIPPI	276	238	227	198	214	158	-42.5%
MISSOURI	1,209	1,175	1,196	1,144	1,161	1,056	-12.7%
NEW HAMPSHIRE	98	84	76	78	92	77	-21.4%
NEW JERSEY	282	260	252	243	146	166	-40.9%
NEW YORK	789	800	744	717	748	603	-23.6%
N. CAROLINA	595	588	554	497	480	440	-26.0%
OHIO	2,432	2,480	2,399	2,335	2,425	2,323	-4.5%
PENNSYLVANIA	1,722	1,586	1,534	1,551	1,485	1,293	-24.9%
RHODE ISLAND	13	12	10	10	10	8	-34.8%
S. CAROLINA	313	327	292	244	247	215	-31.3%
TENNESSEE	1,050	1,000	758	859	833	887	-15.6%
VERMONT	9	8	8	8	9	7	-25.6%
VIRGINIA	336	309	288	267	300	283	-16.0%
WISCONSIN	608	576	528	551	581	467	-23.3%
W. VIRGINIA	1,039	1,030	967	971	985	960	-7.6%
EASTERN SUBTOTAL	20,156	19,721	18,466	18,222	18,550	17,191	-14.7%

1980-1985 SO2 EMISSION TREND IN THE UNITED STATES

WESTERN REGION
(1,000 Tonnes)

WESTERN STATES	1980	1981	1982	1983	1984	1985	85-80 VARI.(%)
ARIZONA	766	957	767	692	629	634	-17.1%
CALIFORNIA	471	406	355	322	338	204	-56.6%
COLORADO	127	126	129	124	138	83	-34.8%
IDAHO	51	51	72	67	62	33	-34.5%
KANSAS	207	214	198	173	224	146	-29.6%
MONTANA	154	162	146	131	133	83	-46.2%
NEBRASKA	71	67	57	57	67	59	-16.3%
NEVADA	134	161	149	138	137	37	-72.8%
NEW MEXICO	238	268	251	267	251	246	3.4%
N. DAKOTA	105	96	109	104	125	201	91.7%
OKLAHOMA	95	110	122	127	150	136	44.1%
OREGON	51	51	49	50	46	40	-20.4%
S. DAKOTA	37	31	39	37	41	39	5.6%
TEXAS	1,201	1,155	1,123	1,132	1,174	1,339	11.5%
UTAH	106	102	94	91	99	65	-38.4%
WASHINGTON	288	298	245	238	244	153	-47.0%
WYOMING	192	192	181	174	201	187	-2.5%
WESTERN SUBTOTAL	4,292	4,446	4,086	3,922	4,060	3,686	-14.1%
U.S. TOTAL	24,448	24,167	22,552	22,144	22,610	20,877	-14.6%

SOURCES:
- 1980 : NAPAP 5.2 (Tapes from MEP).
- 1981-1984 : NAPAP 1985 annual report, SO2 historical trend.
- 1985 : NAPAP inventory, report EPA-600/7-88-022, Nov. 88.

1980-1985 NOX EMISSION TREND IN THE UNITED STATES

EASTERN REGION
(1,000 Tonnes)

EASTERN STATES	1980	1981	1982	1983	1984	1985	85-80 VARI.(%)
ALABAMA	442	440	422	414	485	426	-3.6%
ARKANSAS	192	191	183	179	194	216	12.7%
CONNECTICUT	127	126	121	119	120	116	-8.4%
DELAWARE	57	56	54	53	77	62	10.0%
DIST. COLUMBIA	23	23	22	22	22	19	-19.5%
FLORIDA	646	643	617	605	614	619	-4.2%
GEORGIA	535	533	512	501	524	536	0.1%
ILLINOIS	883	878	844	826	936	881	-0.1%
INDIANA	714	710	682	668	759	799	12.0%
IOWA	277	276	265	260	286	241	-13.2%
KENTUCKY	500	498	478	468	516	472	-5.6%
LOUISIANA	643	640	615	602	664	693	7.7%
MAINE	61	61	58	57	59	61	-0.3%
MARYLAND	237	236	226	222	266	256	8.0%
MASSACHUSETTS	246	245	236	231	256	251	2.0%
MICHIGAN	649	646	620	607	612	597	-7.9%
MINNESOTA	332	331	318	311	331	323	-2.9%
MISSISSIPPI	267	266	255	250	242	217	-18.9%
MISSOURI	499	496	477	467	517	486	-2.4%
NEW HAMPSHIRE	54	53	51	50	58	50	-7.4%
NEW JERSEY	491	489	470	460	351	335	-31.9%
NEW YORK	668	665	639	626	726	568	-15.0%
N. CAROLINA	483	481	462	452	480	455	-5.9%
OHIO	1,104	1,099	1,055	1,034	1,015	924	-16.3%
PENNSYLVANIA	944	940	903	884	937	869	-8.0%
RHODE ISLAND	33	33	31	31	31	27	-16.2%
S. CAROLINA	252	251	241	236	224	235	-6.8%
TENNESSEE	482	480	461	451	500	464	-3.7%
VERMONT	40	40	38	37	38	23	-42.8%
VIRGINIA	348	346	332	326	342	354	1.8%
WISCONSIN	370	368	353	346	352	317	-14.4%
W. VIRGINIA	418	416	400	392	408	419	0.1%
EASTERN SUBTOTAL	13,014	12,952	12,441	12,186	12,942	12,308	-5.4%

1980-1985 NOX EMISSION TREND IN THE UNITED STATES

WESTERN REGION
(1,000 Tonnes)

WESTERN STATES	1980	1981	1982	1983	1984	1985	85-80 VARI.(%)
ARIZONA	239	237	228	223	261	223	-6.7%
CALIFORNIA	1,252	1,246	1,197	1,173	1,031	1,129	-9.8%
COLORADO	276	275	264	259	255	265	-4.2%
IDAHO	83	83	80	78	69	80	-4.4%
KANSAS	465	463	445	436	463	402	-13.6%
MONTANA	127	127	122	119	111	141	10.8%
NEBRASKA	157	156	150	147	180	150	-4.4%
NEVADA	88	87	84	82	86	102	16.3%
NEW MEXICO	230	229	220	216	203	258	12.1%
N. DAKOTA	123	123	118	116	143	166	34.7%
OKLAHOMA	411	409	393	385	348	360	-12.5%
OREGON	206	205	196	192	171	155	-24.7%
S. DAKOTA	72	72	69	67	60	66	-8.3%
TEXAS	3,020	3,005	2,887	2,827	2,656	2,248	-25.6%
UTAH	141	141	135	132	131	155	9.6%
WASHINGTON	267	266	255	250	237	249	-6.7%
WYOMING	226	225	216	211	282	202	-10.6%
WESTERN SUBTOTAL	7,384	7,348	7,059	6,914	6,686	6,350	-14.0%
U.S. TOTAL	20,397	20,300	19,500	19,100	19,628	18,658	-8.5%

SOURCES:
- 1980 : NAPAP 5.2 (Tapes from MEP).
- 1981-1984 : US National totals from EPA 1977-1986 Trend data, prorated by 1980 statewise ratios.
- 1985 : NAPAP inventory, report EPA-600/7-88-022, Nov. 88.

1985 US SO2 EMISSIONS & RANK (STATE TOTAL)

(1,000 metric tons)

EASTERN STATES	SO2	%	Rk	WESTERN STATES	SO2	%	Rk
ALABAMA	654	3.1%	11	ARIZONA	634	3.0%	12
ARKANSAS	99	0.5%	35	CALIFORNIA	204	1.0%	25
CONNECTICUT	79	0.4%	38	COLORADO	83	0.4%	36
DELAWARE	107	0.5%	34	IDAHO	33	0.2%	46
D. COLUMBIA	7	0.0%	48	KANSAS	146	0.7%	32
FLORIDA	602	2.9%	14	MONTANA	83	0.4%	37
GEORGIA	1,008	4.8%	7	NEBRASKA	59	0.3%	42
ILLINOIS	1,268	6.1%	5	NEVADA	37	0.2%	45
INDIANA	1,691	8.1%	2	NEW MEXICO	246	1.2%	23
IOWA	263	1.3%	22	N. DAKOTA	201	1.0%	26
KENTUCKY	798	3.8%	10	OKLAHOMA	136	0.7%	33
LOUISIANA	365	1.7%	18	OREGON	40	0.2%	43
MAINE	72	0.3%	40	S. DAKOTA	39	0.2%	44
MARYLAND	279	1.3%	21	TEXAS	1,339	6.4%	3
MASSACHUSETTS	298	1.4%	19	UTAH	65	0.3%	41
MICHIGAN	500	2.4%	15	WASHINGTON	153	0.7%	31
MINNESOTA	159	0.8%	29	WYOMING	187	0.9%	27
MISSISSIPPI	158	0.8%	30				
MISSOURI	1,056	5.1%	6				
NEW HAMPSHIRE	77	0.4%	39				
NEW JERSEY	166	0.8%	28				
NEW YORK	603	2.9%	13				
N.CAROLINA	440	2.1%	17				
OHIO	2,323	11.1%	1				
PENNSYLVANIA	1,293	6.2%	4				
RHODE ISLAND	8	0.0%	47				
S.CAROLINA	215	1.0%	24				
TENNESSEE	887	4.2%	9				
VERMONT	7	0.0%	49				
VIRGINIA	283	1.4%	20				
WISCONSIN	467	2.2%	16				
W. VIRGINIA	960	4.6%	8				

EASTERN SUBTOTAL: 17,191 82.3% US WESTERN SUBTOTAL: 3,686 17.7% US

UNITED STATES SO2 TOTAL : 20,877 KILOTONNES

Source: NAPAP Inventory Report, EPA-600/7-88-022, Nov. 1988

1985 US NOx EMISSIONS & RANK (STATE TOTAL)

(1,000 metric tons)

EASTERN STATES	NOx	%	Rk	WESTERN STATES	NOx	%	Rk
ALABAMA	426	2.3%	16	ARIZONA	223	1.2%	31
ARKANSAS	216	1.2%	33	CALIFORNIA	1,129	6.1%	2
CONNECTICUT	116	0.6%	40	COLORADO	265	1.4%	24
DELAWARE	62	0.3%	44	IDAHO	80	0.4%	42
D. COLUMBIA	19	0.1%	49	KANSAS	402	2.2%	18
FLORIDA	619	3.3%	8	MONTANA	141	0.8%	39
GEORGIA	536	2.9%	11	NEBRASKA	150	0.8%	38
ILLINOIS	881	4.7%	4	NEVADA	102	0.5%	41
INDIANA	799	4.3%	6	NEW MEXICO	258	1.4%	25
IOWA	241	1.3%	29	N. DAKOTA	166	0.9%	35
KENTUCKY	472	2.5%	13	OKLAHOMA	360	1.9%	19
LOUISIANA	693	3.7%	7	OREGON	155	0.8%	37
MAINE	61	0.3%	45	S. DAKOTA	66	0.4%	43
MARYLAND	256	1.4%	26	TEXAS	2,248	12.0%	1
MASSACHUSETTS	251	1.3%	27	UTAH	155	0.8%	36
MICHIGAN	597	3.2%	9	WASHINGTON	249	1.3%	28
MINNESOTA	323	1.7%	22	WYOMING	202	1.1%	34
MISSISSIPPI	217	1.2%	32				
MISSOURI	486	2.6%	12				
NEW HAMPSHIRE	50	0.3%	46				
NEW JERSEY	335	1.8%	21				
NEW YORK	568	3.0%	10				
N.CAROLINA	455	2.4%	15				
OHIO	924	5.0%	3				
PENNSYLVANIA	869	4.7%	5				
RHODE ISLAND	27	0.1%	47				
S.CAROLINA	235	1.3%	30				
TENNESSEE	464	2.5%	14				
VERMONT	23	0.1%	48				
VIRGINIA	354	1.9%	20				
WISCONSIN	317	1.7%	23				
W. VIRGINIA	419	2.2%	17				

EASTERN SUBTOTAL: 12,308 66.0% US

WESTERN SUBTOTAL: 6,350 34.0% US

UNITED STATES NOx TOTAL : 18,658 KILOTONNES

Source: NAPAP Inventory Report, EPA-600/7-88-022, Nov. 1988

1985 US VOC EMISSIONS & RANK (STATE TOTAL)

(1,000 metric tons)

EASTERN STATES	VOC	%	Rk	WESTERN STATES	VOC	%	Rk
ALABAMA	463	2.3%	16	ARIZONA	204	1.0%	32
ARKANSAS	203	1.0%	33	CALIFORNIA	1,916	9.5%	2
CONNECTICUT	211	1.0%	31	COLORADO	267	1.3%	27
DELAWARE	62	0.3%	45	IDAHO	170	0.8%	35
D. COLUMBIA	26	0.1%	49	KANSAS	222	1.1%	30
FLORIDA	669	3.3%	8	MONTANA	151	0.7%	38
GEORGIA	533	2.6%	11	NEBRASKA	109	0.5%	40
ILLINOIS	868	4.3%	5	NEVADA	69	0.3%	44
INDIANA	520	2.6%	14	NEW MEXICO	156	0.8%	36
IOWA	186	0.9%	34	N. DAKOTA	55	0.3%	47
KENTUCKY	386	1.9%	21	OKLAHOMA	325	1.6%	24
LOUISIANA	586	2.9%	10	OREGON	294	1.5%	26
MAINE	155	0.8%	37	S. DAKOTA	76	0.4%	43
MARYLAND	234	1.2%	29	TEXAS	2,108	10.4%	1
MASSACHUSETTS	380	1.9%	22	UTAH	150	0.7%	39
MICHIGAN	716	3.5%	7	WASHINGTON	435	2.2%	18
MINNESOTA	391	1.9%	20	WYOMING	82	0.4%	41
MISSISSIPPI	250	1.2%	28				
MISSOURI	461	2.3%	17				
NEW HAMPSHIRE	77	0.4%	42				
NEW JERSEY	531	2.6%	12				
NEW YORK	896	4.4%	4				
N.CAROLINA	616	3.0%	9				
OHIO	931	4.6%	3				
PENNSYLVANIA	839	4.2%	6				
RHODE ISLAND	61	0.3%	46				
S.CAROLINA	323	1.6%	25				
TENNESSEE	503	2.5%	15				
VERMONT	48	0.2%	48				
VIRGINIA	524	2.6%	13				
WISCONSIN	392	1.9%	19				
W. VIRGINIA	373	1.8%	23				

EASTERN SUBTOTAL: 13,413 66.4% US

WESTERN SUBTOTAL: 6,790 33.6% US

UNITED STATES VOC TOTAL : 20,203 KILOTONNES

Source: NAPAP Inventory Report, EPA-600/7-88-022, Nov. 1988

1985 US PARTICULATES EMISSIONS & RANK (STATE TOTAL)

(1,000 metric tons)

EASTERN STATES	PART	%	Rk	WESTERN STATES	PART	%	Rk
ALABAMA	332	1.0%	33	ARIZONA	718	2.2%	18
ARKANSAS	778	2.4%	15	CALIFORNIA	1,052	3.2%	8
CONNECTICUT	71	0.2%	45	COLORADO	942	2.9%	12
DELAWARE	31	0.1%	47	IDAHO	293	0.9%	37
D. COLUMBIA	9	0.0%	49	KANSAS	1,605	4.9%	3
FLORIDA	722	2.2%	17	MONTANA	753	2.3%	16
GEORGIA	608	1.9%	22	NEBRASKA	917	2.8%	13
ILLINOIS	643	2.0%	20	NEVADA	797	2.4%	14
INDIANA	308	0.9%	34	NEW MEXICO	1,108	3.4%	5
IOWA	961	3.0%	11	N. DAKOTA	1,135	3.5%	4
KENTUCKY	294	0.9%	36	OKLAHOMA	1,005	3.1%	9
LOUISIANA	404	1.2%	31	OREGON	1,616	5.0%	2
MAINE	99	0.3%	43	S. DAKOTA	606	1.9%	23
MARYLAND	146	0.4%	41	TEXAS	4,959	15.2%	1
MASSACHUSETTS	123	0.4%	42	UTAH	566	1.7%	25
MICHIGAN	636	2.0%	21	WASHINGTON	242	0.7%	39
MINNESOTA	977	3.0%	10	WYOMING	412	1.3%	30
MISSISSIPPI	517	1.6%	27				
MISSOURI	1,068	3.3%	6				
NEW HAMPSHIRE	51	0.2%	46				
NEW JERSEY	198	0.6%	40				
NEW YORK	442	1.4%	29				
N.CAROLINA	590	1.8%	24				
OHIO	678	2.1%	19				
PENNSYLVANIA	1,065	3.3%	7				
RHODE ISLAND	16	0.0%	48				
S.CAROLINA	287	0.9%	38				
TENNESSEE	487	1.5%	28				
VERMONT	87	0.3%	44				
VIRGINIA	354	1.1%	32				
WISCONSIN	541	1.7%	26				
W. VIRGINIA	306	0.9%	35				

EASTERN SUBTOTAL: 13,829 42.5% US

WESTERN SUBTOTAL: 18,727 57.5% US

UNITED STATES PARTICULATES TOTAL: 32,556 KILOTONNES

Source: NEDS Inventory Report, Nov. 1987

1985 US CO EMISSIONS & RANK (STATE TOTAL)

(1,000 metric tons)

EASTERN STATES	CO	%	Rk	WESTERN STATES	CO	%	Rk
ALABAMA	1,154	2.1%	18	ARIZONA	636	1.1%	34
ARKANSAS	591	1.1%	37	CALIFORNIA	4,931	8.9%	1
CONNECTICUT	482	0.9%	38	COLORADO	1,033	1.9%	21
DELAWARE	154	0.3%	49	IDAHO	966	1.7%	22
D. COLUMBIA	85	0.2%	52	KANSAS	611	1.1%	36
FLORIDA	2,363	4.3%	4	MONTANA	785	1.4%	28
GEORGIA	1,600	2.9%	12	NEBRASKA	365	0.7%	39
ILLINOIS	2,184	3.9%	7	NEVADA	249	0.4%	43
INDIANA	1,837	3.3%	9	NEW MEXICO	682	1.2%	31
IOWA	613	1.1%	35	N. DAKOTA	171	0.3%	47
KENTUCKY	926	1.7%	24	OKLAHOMA	897	1.6%	25
LOUISIANA	1,502	2.7%	13	OREGON	958	1.7%	23
MAINE	307	0.6%	41	S. DAKOTA	346	0.6%	40
MARYLAND	712	1.3%	29	TEXAS	4,188	7.6%	2
MASSACHUSETTS	838	1.5%	26	UTAH	652	1.2%	33
MICHIGAN	2,070	3.7%	8	WASHINGTON	1,767	3.2%	10
MINNESOTA	1,209	2.2%	16	WYOMING	296	0.5%	42
MISSISSIPPI	710	1.3%	30				
MISSOURI	1,181	2.1%	17				
NEW HAMPSHIRE	213	0.4%	45				
NEW JERSEY	1,048	1.9%	20				
NEW YORK	2,185	3.9%	6				
N.CAROLINA	1,668	3.0%	11				
OHIO	2,613	4.7%	3				
PENNSYLVANIA	2,264	4.1%	5				
RHODE ISLAND	110	0.2%	51				
S.CAROLINA	805	1.5%	27				
TENNESSEE	1,212	2.2%	15				
VERMONT	145	0.3%	50				
VIRGINIA	1,306	2.4%	14				
WISCONSIN	1,134	2.0%	19				
W. VIRGINIA	680	1.2%	32				

EASTERN SUBTOTAL: 35,903 64.8% US **WESTERN SUBTOTAL: 19,532 35.2% US**

UNITED STATES CO TOTAL : 55,435 KILOTONNES

Source: NEDS Inventory Report, Nov. 1987

1980 US SO2 EMISSIONS & RANK (STATE TOTAL)

(1,000 metric tons)

EASTERN STATES	SO2	%	Rk	WESTERN STATES	SO2	%	Rk
ALABAMA	778	3.2%	13	ARIZONA	766	3.1%	14
ARKANSAS	79	0.3%	41	CALIFORNIA	471	1.9%	18
CONNECTICUT	58	0.2%	43	COLORADO	127	0.5%	34
DELAWARE	113	0.5%	36	IDAHO	51	0.2%	44
D. COLUMBIA	14	0.1%	47	KANSAS	207	0.8%	30
FLORIDA	1,000	4.1%	10	MONTANA	154	0.6%	32
GEORGIA	816	3.3%	11	NEBRASKA	71	0.3%	42
ILLINOIS	1,328	5.4%	4	NEVADA	134	0.5%	33
INDIANA	1,788	7.3%	2	NEW MEXICO	238	1.0%	28
IOWA	303	1.2%	23	N. DAKOTA	105	0.4%	38
KENTUCKY	1,043	4.3%	8	OKLAHOMA	95	0.4%	40
LOUISIANA	364	1.5%	19	OREGON	51	0.2%	45
MAINE	121	0.5%	35	S. DAKOTA	37	0.2%	46
MARYLAND	275	1.1%	27	TEXAS	1,201	4.9%	6
MASSACHUSETTS	325	1.3%	21	UTAH	106	0.4%	37
MICHIGAN	763	3.1%	15	WASHINGTON	288	1.2%	24
MINNESOTA	217	0.9%	29	WYOMING	192	0.8%	31
MISSISSIPPI	276	1.1%	26				
MISSOURI	1,209	4.9%	5				
NEW HAMPSHIRE	98	0.4%	39				
NEW JERSEY	282	1.2%	25				
NEW YORK	789	3.2%	12				
N.CAROLINA	595	2.4%	17				
OHIO	2,432	9.9%	1				
PENNSYLVANIA	1,722	7.0%	3				
RHODE ISLAND	13	0.1%	48				
S.CAROLINA	313	1.3%	22				
TENNESSEE	1,050	4.3%	7				
VERMONT	9	0.0%	49				
VIRGINIA	336	1.4%	20				
WISCONSIN	608	2.5%	16				
W. VIRGINIA	1,039	4.2%	9				

EASTERN SUBTOTAL: 20,156 82.4% US WESTERN SUBTOTAL: 4,292 17.6% US

UNITED STATES SO2 TOTAL : 24,448 KILOTONNES

Source: NAPAP version 5.0 for Area sources, 5.2 for Point sources
from tapes provided by MEP, 1989.

1980 US NOx EMISSIONS & RANK (STATE TOTAL)

(1,000 metric tons)

EASTERN STATES	NOx	%	Rk	WESTERN STATES	NOx	%	Rk
ALABAMA	442	2.2%	18	ARIZONA	239	1.2%	30
ARKANSAS	192	0.9%	35	CALIFORNIA	1,252	6.1%	2
CONNECTICUT	127	0.6%	39	COLORADO	276	1.4%	25
DELAWARE	57	0.3%	45	IDAHO	83	0.4%	42
D. COLUMBIA	23	0.1%	49	KANSAS	465	2.3%	17
FLORIDA	646	3.2%	9	MONTANA	127	0.6%	38
GEORGIA	535	2.6%	11	NEBRASKA	157	0.8%	36
ILLINOIS	883	4.3%	5	NEVADA	88	0.4%	41
INDIANA	714	3.5%	6	NEW MEXICO	230	1.1%	32
IOWA	277	1.4%	24	N. DAKOTA	123	0.6%	40
KENTUCKY	500	2.5%	12	OKLAHOMA	411	2.0%	20
LOUISIANA	643	3.2%	10	OREGON	206	1.0%	34
MAINE	61	0.3%	44	S. DAKOTA	72	0.4%	43
MARYLAND	237	1.2%	31	TEXAS	3,020	14.8%	1
MASSACHUSETTS	246	1.2%	29	UTAH	141	0.7%	37
MICHIGAN	649	3.2%	8	WASHINGTON	267	1.3%	26
MINNESOTA	332	1.6%	23	WYOMING	226	1.1%	33
MISSISSIPPI	267	1.3%	27				
MISSOURI	499	2.4%	13				
NEW HAMPSHIRE	54	0.3%	46				
NEW JERSEY	491	2.4%	14				
NEW YORK	668	3.3%	7				
N.CAROLINA	483	2.4%	15				
OHIO	1,104	5.4%	3				
PENNSYLVANIA	944	4.6%	4				
RHODE ISLAND	33	0.2%	48				
S.CAROLINA	252	1.2%	28				
TENNESSEE	482	2.4%	16				
VERMONT	40	0.2%	47				
VIRGINIA	348	1.7%	22				
WISCONSIN	370	1.8%	21				
W. VIRGINIA	418	2.0%	19				

EASTERN SUBTOTAL: 13,014 63.8% US

WESTERN SUBTOTAL: 7,384 36.2% US

UNITED STATES NOx TOTAL : 20,397 KILOTONNES

Source: NAPAP version 5.0 for Area sources, 5.2 for Point sources
from tapes provided by MEP, 1989.

1980 US VOC EMISSIONS & RANK (STATE TOTAL)

(1,000 metric tons)

EASTERN STATES	VOC	%	Rk	WESTERN STATES	VOC	%	Rk
ALABAMA	300	1.8%	23	ARIZONA	195	1.2%	31
ARKANSAS	160	0.9%	35	CALIFORNIA	1,651	9.8%	2
CONNECTICUT	162	1.0%	34	COLORADO	280	1.7%	24
DELAWARE	55	0.3%	44	IDAHO	182	1.1%	32
D. COLUMBIA	34	0.2%	48	KANSAS	256	1.5%	26
FLORIDA	599	3.6%	7	MONTANA	197	1.2%	30
GEORGIA	358	2.1%	16	NEBRASKA	137	0.8%	37
ILLINOIS	688	4.1%	3	NEVADA	72	0.4%	42
INDIANA	381	2.3%	13	NEW MEXICO	155	0.9%	36
IOWA	181	1.1%	33	N. DAKOTA	41	0.2%	47
KENTUCKY	318	1.9%	20	OKLAHOMA	268	1.6%	25
LOUISIANA	505	3.0%	9	OREGON	252	1.5%	27
MAINE	65	0.4%	43	S. DAKOTA	79	0.5%	41
MARYLAND	248	1.5%	28	TEXAS	2,169	12.9%	1
MASSACHUSETTS	351	2.1%	17	UTAH	128	0.8%	38
MICHIGAN	628	3.7%	6	WASHINGTON	342	2.0%	19
MINNESOTA	312	1.9%	21	WYOMING	95	0.6%	40
MISSISSIPPI	208	1.2%	29				
MISSOURI	442	2.6%	10				
NEW HAMPSHIRE	53	0.3%	45				
NEW JERSEY	425	2.5%	11				
NEW YORK	581	3.4%	8				
N.CAROLINA	389	2.3%	12				
OHIO	669	4.0%	5				
PENNSYLVANIA	684	4.1%	4				
RHODE ISLAND	51	0.3%	46				
S.CAROLINA	372	2.2%	15				
TENNESSEE	378	2.2%	14				
VERMONT	28	0.2%	49				
VIRGINIA	345	2.0%	18				
WISCONSIN	303	1.8%	22				
W. VIRGINIA	99	0.6%	39				

EASTERN SUBTOTAL: 10,370 61.5% US

WESTERN SUBTOTAL: 6,498 38.5% US

UNITED STATES VOC TOTAL : 16,869 KILOTONNES

Source: NAPAP version 5.0 for Area sources, 5.2 for Point sources
from tapes provided by MEP, 1989.

1980 US PARTICULATES EMISSIONS & RANK (STATE TOTAL)

(1,000 metric tons)

EASTERN STATES	PART	%	Rk	WESTERN STATES	PART	%	Rk
ALABAMA	398	1.0%	36	ARIZONA	755	2.0%	22
ARKANSAS	793	2.1%	21	CALIFORNIA	1,389	3.6%	5
CONNECTICUT	109	0.3%	44	COLORADO	1,028	2.7%	11
DELAWARE	45	0.1%	47	IDAHO	299	0.8%	40
D. COLUMBIA	14	0.0%	49	KANSAS	1,679	4.3%	3
FLORIDA	834	2.2%	16	MONTANA	798	2.1%	19
GEORGIA	799	2.1%	18	NEBRASKA	980	2.5%	13
ILLINOIS	846	2.2%	15	NEVADA	834	2.2%	17
INDIANA	450	1.2%	31	NEW MEXICO	1,131	2.9%	8
IOWA	1,122	2.9%	9	N. DAKOTA	1,174	3.0%	7
KENTUCKY	410	1.1%	34	OKLAHOMA	1,004	2.6%	12
LOUISIANA	507	1.3%	30	OREGON	1,672	4.3%	4
MAINE	115	0.3%	43	S. DAKOTA	649	1.7%	24
MARYLAND	206	0.5%	41	TEXAS	5,381	13.9%	1
MASSACHUSETTS	191	0.5%	42	UTAH	626	1.6%	27
MICHIGAN	798	2.1%	20	WASHINGTON	315	0.8%	39
MINNESOTA	1,087	2.8%	10	WYOMING	440	1.1%	32
MISSISSIPPI	532	1.4%	29				
MISSOURI	2,609	6.8%	2				
NEW HAMPSHIRE	60	0.2%	46				
NEW JERSEY	365	0.9%	37				
NEW YORK	727	1.9%	23				
N.CAROLINA	635	1.6%	26				
OHIO	970	2.5%	14				
PENNSYLVANIA	1,299	3.4%	6				
RHODE ISLAND	29	0.1%	48				
S.CAROLINA	409	1.1%	35				
TENNESSEE	595	1.5%	28				
VERMONT	93	0.2%	45				
VIRGINIA	423	1.1%	33				
WISCONSIN	640	1.7%	25				
W. VIRGINIA	346	0.9%	38				

EASTERN SUBTOTAL: 18,456 47.8% US WESTERN SUBTOTAL: 20,153 52.2% US

UNITED STATES PARTICULATES TOTAL : 38,609 KILOTONNES

Source: NAPAP version 5.0 for Area sources, 5.2 for Point sources
from tapes provided by MEP, 1989.

1980 US CO EMISSIONS & RANK (STATE TOTAL)

(1,000 metric tons)

EASTERN STATES	CO	%	Rk	WESTERN STATES	CO	%	Rk
ALABAMA	1,642	1.8%	23	ARIZONA	1,181	1.3%	28
ARKANSAS	948	1.1%	34	CALIFORNIA	8,621	9.6%	1
CONNECTICUT	1,081	1.2%	31	COLORADO	2,087	2.3%	14
DELAWARE	220	0.2%	48	IDAHO	1,160	1.3%	29
D. COLUMBIA	307	0.3%	45	KANSAS	972	1.1%	33
FLORIDA	3,691	4.1%	7	MONTANA	1,289	1.4%	27
GEORGIA	2,114	2.3%	12	NEBRASKA	553	0.6%	39
ILLINOIS	3,852	4.3%	6	NEVADA	472	0.5%	41
INDIANA	2,152	2.4%	11	NEW MEXICO	845	0.9%	37
IOWA	1,003	1.1%	32	N. DAKOTA	256	0.3%	47
KENTUCKY	1,445	1.6%	24	OKLAHOMA	1,681	1.9%	22
LOUISIANA	2,305	2.6%	9	OREGON	1,317	1.5%	26
MAINE	459	0.5%	43	S. DAKOTA	462	0.5%	42
MARYLAND	1,323	1.5%	25	TEXAS	8,217	9.1%	2
MASSACHUSETTS	1,943	2.2%	18	UTAH	898	1.0%	36
MICHIGAN	3,275	3.6%	8	WASHINGTON	2,178	2.4%	10
MINNESOTA	1,748	1.9%	20	WYOMING	535	0.6%	40
MISSISSIPPI	899	1.0%	35				
MISSOURI	2,000	2.2%	17				
NEW HAMPSHIRE	320	0.4%	44				
NEW JERSEY	2,080	2.3%	15				
NEW YORK	4,313	4.8%	3				
N.CAROLINA	2,074	2.3%	16				
OHIO	4,255	4.7%	4				
PENNSYLVANIA	3,969	4.4%	5				
RHODE ISLAND	287	0.3%	46				
S.CAROLINA	1,095	1.2%	30				
TENNESSEE	1,769	2.0%	19				
VERMONT	189	0.2%	49				
VIRGINIA	2,106	2.3%	13				
WISCONSIN	1,714	1.9%	21				
W. VIRGINIA	712	0.8%	38				

EASTERN SUBTOTAL: 57,287 63.6% US   WESTERN SUBTOTAL: 32,724 36.4% US

UNITED STATES CO TOTAL : 90,011 KILOTONNES

Source: NAPAP version 5.0 for Area sources, 5.2 for Point sources
from tapes provided by MEP, 1989.

MAJOR SO2 POINT SOURCES IN THE UNITED STATES IN 1985

RANK	STATE	COMPANY	PLANT	SO2 (Tonnes)	Percent of US Total
1	OHIO	OHIO POWER CO	GAVIN	329,537	1.6%
2	TENNESSEE	TENNESSEE VALLEY AUT	CUMBERLAND	313,254	1.5%
3	ARIZONA	PHELPS DODGE - DOUGLAS		299,374	1.4%
4	GEORGIA	GEORGIA POWER CO	BOWEN	276,968	1.3%
5	INDIANA	PUBLIC SERV CO	GIBSON	276,027	1.3%
6	INDIANA	IND-KEN ELEC CORP	CLIFTY CREEK	243,683	1.2%
7	MISSOURI	UNION ELECTRIC CO	LABADIE	241,486	1.2%
8	OHIO	OHIO POWER CO	MUSKINGUM	229,915	1.1%
9	GEORGIA	GEORGIA POWER CO	WANSLEY	225,575	1.1%
10	WEST VIRGINIA	MONONGAHELA POWER CO	HARRISON	212,912	1.0%
11	OHIO	OHIO VALLEY ELEC CORP	KYGER CREEK	202,053	1.0%
12	ILLINOIS	COMMONWEALTH EDISON	KINCAID	193,684	0.9%
13	ARIZONA	MAGMA COPPER SMELTER	SAN MANUEL	173,661	0.8%
14	PENNSYLVANIA	PENNSYLVANIA ELEC CO	CONMAUGH JO	166,123	0.8%
15	OHIO	OHIO EDISON CO	W H SAMMIS	163,596	0.8%
16	PENNSYLVANIA	WEST PENN POWER CO	HATFIELD	146,132	0.7%
17	OHIO	DAYTON PWR & LGT CO	J M STUART	144,865	0.7%
18	ILLINOIS	CENTRAL ILL PUBLIC	COFFEEN	144,618	0.7%
19	ALABAMA	ALABAMA POWER CO	E C GASTON	144,468	0.7%
20	OHIO	CLEVELAND ELEC ILLUM	EASTLAKE	143,588	0.7%
21	WEST VIRGINIA	OHIO POWER CO	KAMMER	142,460	0.7%
22	MISSOURI	ASSOCIATED ELECTRIC	COOP	138,178	0.7%
23	ILLINOIS	ILLINOIS POWER CO	BASTATE	137,387	0.7%
24	FLORIDA	TAMPA ELECTRIC CO	BIG BEND	134,729	0.6%
25	INDIANA	ALCOA GENERATING CORP		133,615	0.6%
26	OHIO	COLUMBUS & S OH ELEC	CONESVILLE	128,437	0.6%
27	OHIO	CARDINAL OPERATING CO	CARDINAL	127,482	0.6%
28	ALABAMA	TENNESSEE VALLEY AUT	COLBERT	124,755	0.6%
29	PENNSYLVANIA	PENNSYLVANIA POWER & LGT	BI SES	121,398	0.6%
30	GEORGIA	GEORGIA POWER CO	YATES	117,794	0.6%
31	MICHIGAN	DETROIT EDISON CO	MONROE	117,003	0.6%
32	WEST VIRGINIA	VIRGINIA ELEC & POWER	MT STORM	116,403	0.6%
33	TENNESSEE	TENNESSEE VALLEY AUT	GALLATIN	116,393	0.6%
34	TEXAS	TEXAS UTILITIES	MOUNT PLEASANT	114,947	0.6%
35	INDIANA	PUBLIC SERVICE CO	CAYUGA	112,649	0.5%
36	KENTUCKY	TENNESSEE VALLEY AUT	PARADISE	110,675	0.5%
37	PENNSYLVANIA	PENNSYLVANIA ELEC CO	KEYSTONE JO	107,826	0.5%
38	KENTUCKY	LOUISVILLE GAS & ELEC	MILL CREEK	107,760	0.5%
39	WISCONSIN	WIS ELECTRIC POWER	OAK CREEK	104,838	0.5%
40	PUERTO RICO	CARIBBEAN GULF REFINING CO.		104,246	0.5%
41	PENNSYLVANIA	PENNSYLVANIA ELEC CO	HOMER CTYJO	101,360	0.5%
42	PENNSYLVANIA	PENNSYLVANIA PWR & LGT	MONTOUR	97,377	0.5%
43	MISSOURI	ASSOCIATED ELEC COOP	THOMAS HILL	96,404	0.5%
44	WEST VIRGINIA	OHIO POWER CO	MITCHELL	93,737	0.4%
45	PUERTO RICO	PRWRA-AGUIRRE	BARRIO AGUIRRE	92,654	0.4%
46	GEORGIA	GEORGIA POWER CO	HARLLEE BRANCH	91,828	0.4%
47	TENNESSEE	TENNESSEE VALLEY AUT	JOHNSONVILE	88,996	0.4%
48	OHIO	CINCINNATI GAS ELEC	MIAMI FORT	88,616	0.4%
49	FLORIDA	GULF POWER COMPANY	CRIST	88,387	0.4%
50	WEST VIRGINIA	APPALACHIAN POWER CO	JOHN E AMOS	87,214	0.4%
		TOTAL OF 50 MAJOR SOURCES:		7,617,067	36.5%

SOURCE: EPA-NEDS Point Sources Greater than 1,000 Tons/Year.

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MAJOR NOx POINT SOURCES IN THE UNITED STATES IN 1985

RANK	STATE	COMPANY	PLANT	NOx (Tonnes)	Percent of US Total
1	ILLINOIS	COMMONWEALTH EDISON	KINCAID	91,898	0.5%
2	TEXAS	TEXAS UTILITIES	MOUNT PLEASANT	78,500	0.4%
3	OHIO	DAYTON PWR & LGT CO	JM STUART	74,569	0.4%
4	KANSAS	KPL GAS SERVICE (JEC)	BELVUE	74,044	0.4%
5	ILLINOIS	COMMONWEALTH EDISON	POWERTON	72,627	0.4%
6	MICHIGAN	DETROIT EDISON CO	MONROE	70,804	0.4%
7	MINNESOTA	ERIE MINING COMPANY	LAKES TACONITE	69,535	0.4%
8	INDIANA	PUBLIC SERV CO	GIBSON	66,386	0.4%
9	INDIANA	CLIFTY CREEK	MADISON	65,973	0.4%
10	KENTUCKY	TENNESSEE VALLEY AUT	PARADISE	65,470	0.4%
11	INDIANA	IND & MICH ELECTRIC	ROCKPORT ST	62,903	0.3%
12	WEST VIRGINIA	APPALACHIAN POWER CO	JE AMOS	62,618	0.3%
13	TENNESSEE	TENNESSEE VALLEY AUT	CUMBERLAND	60,238	0.3%
14	NEW MEXICO	ARIZONA PUBLIC SERVICE	FOUR CORNER	59,009	0.3%
15	GEORGIA	GEORGIA POWER CO	BOWEN	57,272	0.3%
16	PENNSYLVANIA	PENNSYLVANIA POWER	MANSFLD JO	56,755	0.3%
17	ILLINOIS	CENTRAL ILL PUBLIC SVC	COFFEEN	52,406	0.3%
18	OHIO	OHIO POWER CO	GAVIN	52,122	0.3%
19	OHIO	OHIO EDISON CO	W H SAMMIS	50,419	0.3%
20	MINNESOTA	NORTHERN STATES POWER	SHERBURN	50,392	0.3%
21	OHIO	OHIO VALLEY ELEC CORP	KYGER CREEK	49,341	0.3%
22	NORTH CAROLINA	CAROLINA POWER & LIGHT	ROXBORO	48,120	0.3%
23	MISSOURI	ASSOCIATED ELEC COOP	THOMAS HILL	47,773	0.3%
24	TEXAS	TEXAS UTILITIES	TATUM	44,808	0.2%
25	FLORIDA	TAMPA ELECTRIC CO	BIG BEND	42,914	0.2%
26	FLORIDA	FLORIDA POWER CORP	CRYSTAL RIVER	42,235	0.2%
27	OHIO	OHIO POWER CO	MUSKINGUM RIVER	40,898	0.2%
28	MISSOURI	ASSOCIATED ELECTRIC	COOP ST	40,708	0.2%
29	ALABAMA	ALABAMA POWER CO	E C GASTON	40,498	0.2%
30	PENNSYLVANIA	PENNSYLVANIA ELEC CO	HOMER CITY JO	40,339	0.2%
31	TEXAS	TEXAS UTILITIES	FAIRFIELD	40,201	0.2%
32	PENNSYLVANIA	PENNSYLVANIA PWER&LGHT	BI SES	39,876	0.2%
33	PENNSYLVANIA	PENNSYLVANIA ELEC CO	CONMAUGH JO	39,846	0.2%
34	NORTH CAROLINA	DUKE POWER CO	BELEWS CRK	39,577	0.2%
35	WEST VIRGINIA	MONONGAHELA POWER CO	HARRISON	39,534	0.2%
36	PENNSYLVANIA	PENNSYLVANIA ELEC CO	KEYSTONE JO	39,497	0.2%
37	GEORGIA	GEORGIA POWER CO	HARLLEE BRANCH	39,243	0.2%
38	ILLINOIS	ILLINOIS POWER CO	BASTATE	38,373	0.2%
39	ARIZONA	SALT RIVER PROJECT	NAVAJO	38,102	0.2%
40	MISSOURI	UNION ELECTRIC CO	LABADIE	37,169	0.2%
41	PENNSYLVANIA	WEST PENN POWER CO	HATFIELD	35,767	0.2%
42	PENNSYLVANIA	PENNSYLVANIA PWR&LGHT	MONTOUR	34,956	0.2%
43	WASHINGTON	PACIFIC POWER & LIGH	CENTRALIA	33,876	0.2%
44	LOUISIANA	CENT LA ELEC CO	LENA	33,516	0.2%
45	GEORGIA	GEORGIA POWER CO	WANSLEY	33,498	0.2%
46	FLORIDA	TAMPA ELECTRIC CO	F J GANNON	33,413	0.2%
47	WEST VIRGINIA	OHIO POWER CO	MITCHELL	32,782	0.2%
48	TEXAS	CELANESE CHEM CO	PAMPA	32,623	0.2%
49	WEST VIRGINIA	OHIO POWER CO	KAMMER	31,878	0.2%
50	ILLINOIS	COMMONWEALTH EDISON	LARKIN	31,282	0.2%
		TOTAL OF 50 MAJOR SOURCES:		2,456,580	13.2%

SOURCE: EPA-NEDS Point Sources Greater than 1,000 Tons/Year.

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SECTION D : NORTH AMERICA EMISSIONS

NORTH AMERICA SO2 EMISSION TREND - 1970 TO 1985

(1,000 Tonnes)

COUNTRY	REGION	1970	1972	1974	1976	1978	1980	1981	1982	1983	1984	1985
CANADA	EAST	5,636	5,135	4,763	4,357	3,635	3,819	3,574	2,821	2,861	3,176	2,972
	WEST	1,041	1,240	1,118	963	871	823	764	745	764	778	732
	TOTAL	6,677	6,375	5,881	5,320	4,506	4,642	4,338	3,566	3,625	3,954	3,704
UNITED STATES	EAST	22,896	22,247	21,922	22,543	21,330	20,156	19,721	18,466	18,222	18,550	17,191
	WEST	5,304	5,153	5,078	5,123	4,710	4,292	4,446	4,086	3,922	4,060	3,686
	TOTAL	28,200	27,400	27,000	27,666	26,040	24,448	24,167	22,552	22,144	22,610	20,877
NORTH AMERICA	EAST	28,532	27,382	26,685	26,900	24,964	23,975	23,295	21,287	21,083	21,726	20,163
	WEST	6,344	6,393	6,196	6,086	5,581	5,115	5,210	4,830	4,685	4,838	4,418
	TOTAL	34,877	33,775	32,881	32,986	30,545	29,090	28,505	26,117	25,768	26,564	24,581

SOURCES - US DATA 1970 to 1974: National totals from EPA-450/4-85-014, breakdown by assuming 75 ratios
1975 to 1984: NAPAP annual report, 1985.
1980: NAPAP versions 5.2 (Points and 5.0 (area) from data tapes provided by MEP, 1989
1985: NAPAP Inventory report, EPA-600/7-88-022, Nov. 88
1986: US report on 77-86 emissions trend, national total breakdown by assuming 85 ratio.

- CANADA 1970-1984: EPS trend report, May 87.
1985: EPS data, Feb. 1989.

- ONTARIO 1970-1978: EPS Reports.
1980-1985: MOE data.

NORTH AMERICA NOx EMISSION TREND - 1970 TO 1985

(1,000 Tonnes)

COUNTRY	REGION	1970	1972	1974	1976	1978	1980	1981	1982	1983	1984	1985
CANADA	EAST	872	1,005	1,097	1,104	1,172	1,162	1,106	1,086	1,059	1,076	1,075
	WEST	488	583	677	705	738	795	765	798	797	824	885
	TOTAL	1,361	1,588	1,774	1,809	1,910	1,957	1,872	1,884	1,856	1,901	1,960
UNITED STATES	EAST	13,651	14,858	14,858	14,663	14,076	13,014	12,952	12,441	12,186	12,942	12,308
	WEST	4,449	4,842	4,842	5,637	7,024	7,384	7,348	7,059	6,914	6,686	6,350
	TOTAL	18,100	19,700	19,700	20,300	21,100	20,397	20,300	19,500	19,100	19,628	18,658
NORTH AMERICA	EAST	14,524	15,863	15,955	15,766	15,248	14,176	14,058	13,527	13,245	14,019	13,383
	WEST	4,937	5,425	5,519	6,342	7,762	8,179	8,114	7,857	7,711	7,510	7,235
	TOTAL	19,461	21,288	21,474	22,109	23,010	22,354	22,172	21,384	20,956	21,529	20,618

SOURCES - US DATA 1970 to 1974: National totals from EPA-450/4-85-014, breakdown by assuming 75 ratios
1975 to 1984: NAPAP annual report, 1985.
1980: NAPAP versions 5.2 (Points and 5.0 (area) from data tapes provided by MEP, 1989
1985: NAPAP Inventory report, EPA-600/7-88-022, Nov. 88
1986: US report on 77-86 emissions trend, national total breakdown by assuming 85 ratio.

- CANADA EPS data except for Ontario (MOE, 80 to 85 data).
1970-1984: EPS trend report, May 87.
1985: EPS data, Feb. 1989.
(excludes forest fire emssions).

1985 NORTH AMERICA S02 EMISSIONS (STATE TOTAL) & RANK
(1,000 metric tons)

	EASTERN STATES/PROV.	S02	%	Rk
CANADA	MANITOBA	469	1.9%	19
	NEW BRUNSWICK	138	0.6%	38
	NEWFOUNDLAND	43	0.2%	51
	NOVA SCOTIA	170	0.7%	32
	ONTARIO	1,457	5.9%	3
	P.E.ISLAND	2	0.0%	60
	QUEBEC	693	2.8%	12
UNITED STATES	ALABAMA	654	2.7%	13
	ARKANSAS	99	0.4%	42
	CONNECTICUT	79	0.3%	46
	DELAWARE	107	0.4%	40
	D. COLUMBIA	7	0.0%	57
	FLORIDA	602	2.5%	16
	GEORGIA	1,008	4.1%	8
	ILLINOIS	1,268	5.2%	6
	INDIANA	1,691	6.9%	2
	IOWA	263	1.1%	26
	KENTUCKY	798	3.2%	11
	LOUISIANA	365	1.5%	22
	MAINE	72	0.3%	48
	MARYLAND	279	1.1%	25
	MASSACHUSETTS	298	1.2%	23
	MICHIGAN	500	2.0%	18
	MINNESOTA	159	0.6%	34
	MISSISSIPPI	158	0.6%	35
	MISSOURI	1,056	4.3%	7
	NEW HAMPSHIRE	77	0.3%	47
	NEW JERSEY	166	0.7%	33
	NEW YORK	603	2.5%	15
	N.CAROLINA	440	1.8%	21
	OHIO	2,323	9.5%	1
	PENNSYLVANIA	1,293	5.3%	5
	RHODE ISLAND	8	0.0%	56
	S.CAROLINA	215	0.9%	28
	TENNESSEE	887	3.6%	10
	VERMONT	7	0.0%	58
	VIRGINIA	283	1.1%	24
	WISCONSIN	467	1.9%	20
	W. VIRGINIA	960	3.9%	9

	WESTERN STATES/PROV.	S02	%	Rk
CANADA	ALBERTA	539	2.2%	17
	BRITISH COLUMBIA	106	0.4%	41
	NW TERR/YUKON	2	0.0%	59
	SASKATCHEWAN	86	0.3%	43
UNITED STATES	ARIZONA	634	2.6%	14
	CALIFORNIA	204	0.8%	29
	COLORADO	83	0.3%	44
	IDAHO	33	0.1%	55
	KANSAS	146	0.6%	37
	MONTANA	83	0.3%	45
	NEBRASKA	59	0.2%	50
	NEVADA	37	0.1%	54
	NEW MEXICO	246	1.0%	27
	N. DAKOTA	201	0.8%	30
	OKLAHOMA	136	0.6%	39
	OREGON	40	0.2%	52
	S. DAKOTA	39	0.2%	53
	TEXAS	1,339	5.4%	4
	UTAH	65	0.3%	49
	WASHINGTON	153	0.6%	36
	WYOMING	187	0.8%	31

** NORTH AMERICA EMISSION SUMMARY:

EASTERN	- CANADA	2,972	12.1%
	- U.S.	17,191	69.9%
	- N.A.	20,163	82.0%
WESTERN	- CANADA	732	3.0%
	- U.S.	3,686	15.0%
	- N.A.	4,418	18.0%
NATIONAL	- CANADA	3,704	15.1%
	- U.S.	20,877	84.9%
NORTH AMERICA :		24,581	100.0%

NORTH AMERICA S02 TOTAL : 24,581 KILOTONNES

Source: - U.S.: NAPAP Inventory Report, EPA-600/7-88-022, Nov. 1988
- CANADA: EPS (July 89); ONTARIO: MOE.

1985 NORTH AMERICA NOx EMISSIONS (STATE TOTAL) & RANK
(1,000 metric tons)

	EASTERN STATES/PROV.	NOx	%	Rk
CANADA	MANITOBA	85	0.4%	47
	NEW BRUNSWICK	46	0.2%	54
	NEWFOUNDLAND	35	0.2%	55
	NOVA SCOTIA	78	0.4%	49
	ONTARIO	585	2.8%	10
	P.E.ISLAND	6	0.0%	60
	QUEBEC	240	1.2%	33
UNITED STATES	ALABAMA	426	2.1%	18
	ARKANSAS	216	1.0%	37
	CONNECTICUT	116	0.6%	45
	DELAWARE	62	0.3%	51
	D. COLUMBIA	19	0.1%	58
	FLORIDA	619	3.0%	8
	GEORGIA	536	2.6%	12
	ILLINOIS	881	4.3%	4
	INDIANA	799	3.9%	6
	IOWA	241	1.2%	32
	KENTUCKY	472	2.3%	14
	LOUISIANA	693	3.4%	7
	MAINE	61	0.3%	52
	MARYLAND	256	1.2%	29
	MASSACHUSETTS	251	1.2%	30
	MICHIGAN	597	2.9%	9
	MINNESOTA	323	1.6%	24
	MISSISSIPPI	217	1.1%	36
	MISSOURI	486	2.4%	13
	NEW HAMPSHIRE	50	0.2%	53
	NEW JERSEY	335	1.6%	23
	NEW YORK	568	2.8%	11
	N.CAROLINA	455	2.2%	16
	OHIO	924	4.5%	3
	PENNSYLVANIA	869	4.2%	5
	RHODE ISLAND	27	0.1%	56
	S.CAROLINA	235	1.1%	34
	TENNESSEE	464	2.3%	15
	VERMONT	23	0.1%	57
	VIRGINIA	354	1.7%	22
	WISCONSIN	317	1.5%	25
	W. VIRGINIA	419	2.0%	19

	WESTERN STATES/PROV.	NOx	%	Rk
CANADA	ALBERTA	447	2.2%	17
	BRITISH COLUMBIA	263	1.3%	27
	NW TERR/YUKON	16	0.1%	59
	SASKATCHEWAN	158	0.8%	40
UNITED STATES	ARIZONA	223	1.1%	35
	CALIFORNIA	1,129	5.5%	2
	COLORADO	265	1.3%	26
	IDAHO	80	0.4%	48
	KANSAS	402	2.0%	20
	MONTANA	141	0.7%	44
	NEBRASKA	150	0.7%	43
	NEVADA	102	0.5%	46
	NEW MEXICO	258	1.3%	28
	N. DAKOTA	166	0.8%	39
	OKLAHOMA	360	1.7%	21
	OREGON	155	0.8%	42
	S. DAKOTA	66	0.3%	50
	TEXAS	2,248	10.9%	1
	UTAH	155	0.8%	41
	WASHINGTON	249	1.2%	31
	WYOMING	202	1.0%	38

** NORTH AMERICA EMISSION SUMMARY:

EASTERN	- CANADA	1,075	5.2%
	- U.S.	12,308	59.7%
	- N.A.	13,383	64.9%
WESTERN	- CANADA	885	4.3%
	- U.S.	6,350	30.8%
	- N.A.	7,235	35.1%
NATIONAL	- CANADA	1,959	9.5%
	- U.S.	18,658	90.5%
NORTH AMERICA :		20,617	100.0%

NORTH AMERICA NOx TOTAL : 20,617 KILOTONNES

Source: - U.S.: NAPAP Inventory Report, EPA-600/7-88-022, Nov. 1988
- CANADA: EPS (July 89); ONTARIO: MOE.

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1985 NORTH AMERICA VOC EMISSIONS (STATE TOTAL) & RANK
(1,000 metric tons)

	EASTERN STATES/PROV.	VOC	%	Rk		WESTERN STATES/PROV.	VOC	%	Rk
C	MANITOBA	68	0.3%	50	C				
A	NEW BRUNSWICK	46	0.2%	56	A	ALBERTA	228	1.0%	33
N	NEWFOUNDLAND	36	0.2%	57	N	BRITISH COLUMBIA	289	1.3%	29
A	NOVA SCOTIA	54	0.2%	54	A	NW TERR/YUKON	7	0.0%	60
D	ONTARIO	621	2.8%	9	D	SASKATCHEWAN	80	0.4%	46
A	P.E.ISLAND	11	0.1%	59	A				
	QUEBEC	359	1.6%	25					
U	ALABAMA	463	2.1%	17	U	ARIZONA	204	0.9%	36
N	ARKANSAS	203	0.9%	37	N	CALIFORNIA	1,916	8.7%	2
I	CONNECTICUT	211	1.0%	35	I	COLORADO	267	1.2%	30
T	DELAWARE	62	0.3%	51	T	IDAHO	170	0.8%	39
E	D. COLUMBIA	26	0.1%	58	E	KANSAS	222	1.0%	34
D	FLORIDA	669	3.0%	8	D	MONTANA	151	0.7%	42
	GEORGIA	533	2.4%	12		NEBRASKA	109	0.5%	44
S	ILLINOIS	868	3.9%	5	S	NEVADA	69	0.3%	49
T	INDIANA	520	2.4%	15	T	NEW MEXICO	156	0.7%	40
A	IOWA	186	0.8%	38	A	N. DAKOTA	55	0.3%	53
T	KENTUCKY	386	1.8%	22	T	OKLAHOMA	325	1.5%	26
E	LOUISIANA	586	2.7%	11	E	OREGON	294	1.3%	28
S	MAINE	155	0.7%	41	S	S. DAKOTA	76	0.3%	48
	MARYLAND	234	1.1%	32		TEXAS	2,108	9.6%	1
	MASSACHUSETTS	380	1.7%	23		UTAH	150	0.7%	43
	MICHIGAN	716	3.3%	7		WASHINGTON	435	2.0%	19
	MINNESOTA	391	1.8%	21		WYOMING	82	0.4%	45
	MISSISSIPPI	250	1.1%	31					
	MISSOURI	461	2.1%	18					
	NEW HAMPSHIRE	77	0.4%	47					
	NEW JERSEY	531	2.4%	13					
	NEW YORK	896	4.1%	4					
	N.CAROLINA	616	2.8%	10					
	OHIO	931	4.2%	3					
	PENNSYLVANIA	839	3.8%	6					
	RHODE ISLAND	61	0.3%	52					
	S.CAROLINA	323	1.5%	27					
	TENNESSEE	503	2.3%	16					
	VERMONT	48	0.2%	55					
	VIRGINIA	524	2.4%	14					
	WISCONSIN	392	1.8%	20					
	W. VIRGINIA	373	1.7%	24					

** NORTH AMERICA EMISSION SUMMARY:

EASTERN	- CANADA	1,194	5.4%
	- U.S.	13,413	61.0%
	- N.A.	14,607	66.4%
WESTERN	- CANADA	604	2.7%
	- U.S.	6,790	30.9%
	- N.A.	7,393	33.6%
NATIONAL	- CANADA	1,797	8.2%
	- U.S.	20,203	91.8%
NORTH AMERICA :		22,000	100.0%

NORTH AMERICA VOC TOTAL : 22,000 KILOTONNES

Source: - U.S.: NAPAP Inventory Report, EPA-600/7-88-022, Nov. 1988
- CANADA: EPS (July 89); ONTARIO: MOE.

1985 NORTH AMERICA PARTICULATES EMISSIONS (STATE TOTAL) & RANK
(1,000 metric tons)

	EASTERN STATES/PROV.	PART	%	Rk		WESTERN STATES/PROV.	PART	%	Rk
C	MANITOBA	73	0.2%	53	C				
A	NEW BRUNSWICK	94	0.3%	50	A	ALBERTA	252	0.7%	41
N	NEWFOUNDLAND	124	0.4%	47	N	BRITISH COLUMBIA	423	1.2%	30
A	NOVA SCOTIA	74	0.2%	52	A	NW TERR/YUKON	11	0.0%	58
D	ONTARIO	201	0.6%	43	D	SASKATCHEWAN	173	0.5%	45
A	P.E.ISLAND	10	0.0%	59	A				
	QUEBEC	323	0.9%	35					
U	ALABAMA	332	1.0%	34	U	ARIZONA	718	2.1%	18
N	ARKANSAS	778	2.3%	15	N	CALIFORNIA	1,052	3.1%	8
I	CONNECTICUT	71	0.2%	54	I	COLORADO	942	2.7%	12
T	DELAWARE	31	0.1%	56	T	IDAHO	293	0.9%	39
E	D. COLUMBIA	9	0.0%	60	E	KANSAS	1,605	4.7%	3
D	FLORIDA	722	2.1%	17	D	MONTANA	753	2.2%	16
	GEORGIA	608	1.8%	22		NEBRASKA	917	2.7%	13
S	ILLINOIS	643	1.9%	20	S	NEVADA	797	2.3%	14
T	INDIANA	308	0.9%	36	T	NEW MEXICO	1,108	3.2%	5
A	IOWA	961	2.8%	11	A	N. DAKOTA	1,135	3.3%	4
T	KENTUCKY	294	0.9%	38	T	OKLAHOMA	1,005	2.9%	9
E	LOUISIANA	404	1.2%	32	E	OREGON	1,616	4.7%	2
S	MAINE	99	0.3%	49	S	S. DAKOTA	606	1.8%	23
	MARYLAND	146	0.4%	46		TEXAS	4,959	14.5%	1
	MASSACHUSETTS	123	0.4%	48		UTAH	566	1.7%	25
	MICHIGAN	636	1.9%	21		WASHINGTON	242	0.7%	42
	MINNESOTA	977	2.8%	10		WYOMING	412	1.2%	31
	MISSISSIPPI	517	1.5%	27					
	MISSOURI	1,068	3.1%	6					
	NEW HAMPSHIRE	51	0.1%	55					
	NEW JERSEY	198	0.6%	44					
	NEW YORK	442	1.3%	29					
	N.CAROLINA	590	1.7%	24					
	OHIO	678	2.0%	19					
	PENNSYLVANIA	1,065	3.1%	7					
	RHODE ISLAND	16	0.0%	57					
	S.CAROLINA	287	0.8%	40					
	TENNESSEE	487	1.4%	28					
	VERMONT	87	0.3%	51					
	VIRGINIA	354	1.0%	33					
	WISCONSIN	541	1.6%	26					
	W. VIRGINIA	306	0.9%	37					

** NORTH AMERICA EMISSION SUMMARY:

EASTERN	- CANADA	900	2.6%
	- U.S.	13,829	40.3%
	- N.A.	14,728	42.9%
WESTERN	- CANADA	859	2.5%
	- U.S.	18,727	54.6%
	- N.A.	19,586	57.1%
NATIONAL	- CANADA	1,758	5.1%
	- U.S.	32,556	94.9%
NORTH AMERICA :		34,314	100.0%

NORTH AMERICA PART TOTAL : 34,314 KILOTONNES

Source: - U.S.: NEDS Inventory, Nov. 1987
- CANADA: EPS (July 89); ONTARIO: MOE.

1985 NORTH AMERICA CO EMISSIONS (STATE TOTAL) & RANK
(1,000 metric tons)

	EASTERN STATES/PROV.	CO	%	Rk
CANADA	MANITOBA	431	0.7%	44
	NEW BRUNSWICK	288	0.4%	50
	NEWFOUNDLAND	198	0.3%	53
	NOVA SCOTIA	299	0.5%	48
	ONTARIO	3,054	4.6%	3
	P.E.ISLAND	64	0.1%	59
	QUEBEC	1,915	2.9%	11
UNITED STATES	ALABAMA	1,154	1.7%	22
	ARKANSAS	591	0.9%	42
	CONNECTICUT	482	0.7%	43
	DELAWARE	154	0.2%	55
	D. COLUMBIA	85	0.1%	58
	FLORIDA	2,363	3.6%	6
	GEORGIA	1,600	2.4%	15
	ILLINOIS	2,184	3.3%	9
	INDIANA	1,837	2.8%	12
	IOWA	613	0.9%	40
	KENTUCKY	926	1.4%	28
	LOUISIANA	1,502	2.3%	16
	MAINE	307	0.5%	47
	MARYLAND	712	1.1%	33
	MASSACHUSETTS	838	1.3%	30
	MICHIGAN	2,070	3.1%	10
	MINNESOTA	1,209	1.8%	20
	MISSISSIPPI	710	1.1%	34
	MISSOURI	1,181	1.8%	21
	NEW HAMPSHIRE	213	0.3%	52
	NEW JERSEY	1,048	1.6%	24
	NEW YORK	2,185	3.3%	8
	N.CAROLINA	1,668	2.5%	14
	OHIO	2,613	4.0%	4
	PENNSYLVANIA	2,264	3.4%	7
	RHODE ISLAND	110	0.2%	57
	S.CAROLINA	805	1.2%	31
	TENNESSEE	1,212	1.8%	19
	VERMONT	145	0.2%	56
	VIRGINIA	1,306	2.0%	17
	WISCONSIN	1,134	1.7%	23
	W. VIRGINIA	680	1.0%	36

	WESTERN STATES/PROV.	CO	%	Rk
CANADA	ALBERTA	1,277	1.9%	18
	BRITISH COLUMBIA	2,377	3.6%	5
	NW TERR/YUKON	46	0.1%	60
	SASKATCHEWAN	644	1.0%	38
UNITED STATES	ARIZONA	636	1.0%	39
	CALIFORNIA	4,931	7.5%	1
	COLORADO	1,033	1.6%	25
	IDAHO	966	1.5%	26
	KANSAS	611	0.9%	41
	MONTANA	785	1.2%	32
	NEBRASKA	365	0.6%	45
	NEVADA	249	0.4%	51
	NEW MEXICO	682	1.0%	35
	N. DAKOTA	171	0.3%	54
	OKLAHOMA	897	1.4%	29
	OREGON	958	1.5%	27
	S. DAKOTA	346	0.5%	46
	TEXAS	4,188	6.3%	2
	UTAH	652	1.0%	37
	WASHINGTON	1,767	2.7%	13
	WYOMING	296	0.4%	49

** NORTH AMERICA EMISSION SUMMARY:

EASTERN	- CANADA	6,248	9.5%
	- U.S.	35,903	54.4%
	- N.A.	42,151	63.8%
WESTERN	- CANADA	4,344	6.6%
	- U.S.	19,532	29.6%
	- N.A.	23,876	36.2%
NATIONAL	- CANADA	10,592	16.0%
	- U.S.	55,435	84.0%
NORTH AMERICA :		66,027	100.0%

NORTH AMERICA CO TOTAL : 66,027 KILOTONNES

Source: - U.S.: NEDS Inventory Report, Nov. 1987
- CANADA: EPS (July 89); ONTARIO: MOE.

MAJOR SO2 POINT SOURCES IN THE NORTH AMERICA IN 1985

RANK	STATE	COMPANY	PLANT	SO2 (Tonnes)	% of NA Total	CANADA SOURCES
1	ONTARIO	INCO		695,000	2.8%	*
2	QUEBEC	NORANDA		436,000	1.8%	*
3	OHIO	OHIO POWER CO	GAVIN	329,537	1.3%	
4	TENNESSEE	TENNESSEE VALLEY AUT	CUMBERLAND	313,254	1.3%	
5	ARIZONA	PHELPS DODGE - DOUGLAS		299,374	1.2%	
6	GEORGIA	GEORGIA POWER CO	BOWEN	276,968	1.1%	
7	INDIANA	PUBLIC SERV CO	GIBSON	276,027	1.1%	
8	MANITOBA	HBMS		270,000	1.1%	*
9	INDIANA	IND-KEN ELEC CORP	CLIFTY CREEK	243,683	1.0%	
10	MISSOURI	UNION ELECTRIC CO	LABADIE	241,486	1.0%	
11	OHIO	OHIO POWER CO	MUSKINGUM	229,915	0.9%	
12	GEORGIA	GEORGIA POWER CO	WANSLEY	225,575	0.9%	
13	WEST VIRGINIA	MONONGAHELA POWER CO	HARRISON	212,912	0.9%	
14	OHIO	OHIO VALLEY ELEC CORP	KYGER CREEK	202,053	0.8%	
15	ILLINOIS	COMMONWEALTH EDISON	KINCAID	193,684	0.8%	
16	MANITOBA	INCO		188,000	0.8%	*
17	ARIZONA	MAGMA COPPER SMELTER	SAN MANUEL	173,661	0.7%	
18	ONTARIO	ONTARIO HYDRO	NANTICOKE	169,000	0.7%	*
19	PENNSYLVANIA	PENNSYLVANIA ELEC CO	CONMAUGH JO	166,123	0.7%	
20	OHIO	OHIO EDISON CO	W H SAMMIS	163,596	0.7%	
21	PENNSYLVANIA	WEST PENN POWER CO	HATFIELD	146,132	0.6%	
22	OHIO	DAYTON PWR & LGT CO	J M STUART	144,865	0.6%	
23	ILLINOIS	CENTRAL ILL PUBLIC	COFFEEN	144,618	0.6%	
24	ALABAMA	ALABAMA POWER CO	E C GASTON	144,468	0.6%	
25	OHIO	CLEVELAND ELEC ILLUM	EASTLAKE	143,588	0.6%	
26	WEST VIRGINIA	OHIO POWER CO	KAMMER	142,460	0.6%	
27	MISSOURI	ASSOCIATED ELECTRIC	COOP	138,178	0.6%	
28	ILLINOIS	ILLINOIS POWER CO	BASTATE	137,387	0.6%	
29	FLORIDA	TAMPA ELECTRIC CO	BIG BEND	134,729	0.5%	
30	INDIANA	ALCOA GENERATING CORP		133,615	0.5%	
31	OHIO	COLUMBUS & S OH ELEC	CONESVILLE	128,437	0.5%	
32	OHIO	CARDINAL OPERATING CO	CARDINAL	127,482	0.5%	
33	ALABAMA	TENNESSEE VALLEY AUT	COLBERT	124,755	0.5%	
34	PENNSYLVANIA	PENNSYLVANIA POWER & LGT	BI SES	121,398	0.5%	
35	ONTARIO	ONTARIO HYDRO	LAMBTON	118,000	0.5%	*
36	GEORGIA	GEORGIA POWER CO	YATES	117,794	0.5%	
37	MICHIGAN	DETROIT EDISON CO	MONROE	117,003	0.5%	
38	WEST VIRGINIA	VIRGINIA ELEC & POWER	MT STORM	116,403	0.5%	
39	TENNESSEE	TENNESSEE VALLEY AUT	GALLATIN	116,393	0.5%	
40	ONTARIO	ALGOMA (WAWA)		115,890	0.5%	*
41	TEXAS	TEXAS UTILITIES	MOUNT PLEASANT	114,947	0.5%	
42	INDIANA	PUBLIC SERVICE CO	CAYUGA	112,649	0.5%	
43	KENTUCKY	TENNESSEE VALLEY AUT	PARADISE	110,675	0.5%	
44	PENNSYLVANIA	PENNSYLVANIA ELEC CO	KEYSTONE JO	107,826	0.4%	
45	KENTUCKY	LOUISVILLE GAS & ELEC	MILL CREEK	107,760	0.4%	
46	WISCONSIN	WIS ELECTRIC POWER	OAK CREEK	104,838	0.4%	
47	PUERTO RICO	CARIBBEAN GULF REFINING CO.		104,246	0.4%	
48	PENNSYLVANIA	PENNSYLVANIA ELEC CO	HOMER CTYJO	101,360	0.4%	
49	PENNSYLVANIA	PENNSYLVANIA PWR & LGT	MONTOUR	97,377	0.4%	
50	MISSOURI	ASSOCIATED ELEC COOP	THOMAS HILL	96,404	0.4%	
		TOTAL 50 MAJOR SOURCES:		8,977,525	36.5%	

SOURCE: EPA-NEDS Point Sources Greater than 1,000 Tons/Year.

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MAJOR SO2 POINT SOURCES IN THE NORTH AMERICA IN 1980

RANK	STATE	COMPANY	PLANT	SO2 (Tonnes)	% of NA Total	CANADA SOURCES
1	ONTARIO	INCO		812,118	2.8%	*
2	QUEBEC	NORANDA		549,000	1.9%	*
3	OHIO	OHIO POWER CO	GAVIN	334,195	1.1%	
4	TENNESSEE	TENNESSEE VALLEY AUTH	CUMBERLAND	333,815	1.1%	
5	KENTUCKY	TENNESSEE VALLEY AUTH	PARADISE	323,089	1.1%	
6	INDIANA	PUBLIC SERV CO OF IND	GIBSON	282,318	1.0%	
7	INDIANA	INDIANA-KETUCKY ELEC CORP	CLIFTY CREEK	268,294	0.9%	
8	ARIZONA	PHELPS DODGE	DOUGLAS	258,059	0.9%	
9	MANITOBA	HUDSON BAY M&S		248,387	0.9%	*
10	ILLINOIS	ILLINOIS POWER CO	BALDWIN	241,338	0.8%	
11	GEORGIA	GEORGIA POWER CO	BOWEN	233,404	0.8%	
12	OHIO	OHIO POWER CO	MUSKINGUM RIVER	227,561	0.8%	
13	MANITOBA	INCO		219,000	0.8%	*
14	MISSOURI	UNION ELECTRIC CO	LABADIE	218,851	0.8%	
15	MICHIGAN	DETROIT EDISON CO	MONROE	217,341	0.7%	
16	W. VIRGINIA	MONONGAHELA POWER CO	HARRISON	200,845	0.7%	
17	GEORGIA	GEORGIA POWER CO	WANSLEY	197,079	0.7%	
18	PENNSYLVANIA	PENNSYLVANIA ELEC CO	CONMAUGH JO	190,863	0.7%	
19	OHIO	OHIO VALLEY ELEC CORP	KYGER CREEK	188,357	0.6%	
20	MISSOURI	ASSOCIATED ELEC COOP	NEW MADRID	185,777	0.6%	
21	ILLINOIS	COMMONWEALTH EDISON CO	KINCAID	171,709	0.6%	
22	PENNSYLVANIA	PENNSYLVANIA ELEC CO	HOMER CTYJO	171,522	0.6%	
23	ONTARIO	ALGOMA (WAWA)		160,583	0.6%	*
24	PENNSYLVANIA	WEST PENN POWER CO	HATFIELD	159,335	0.5%	
25	OHIO	COLUMBUS & S OH ELEC CO	CONESVILLE	158,920	0.5%	
26	W. VIRGINIA	OHIO POWER CO	MITCHELL	158,674	0.5%	
27	ALABAMA	ALABAMA POWER CO	E C GASTON	155,616	0.5%	
28	MISSOURI	KANSAS CITY PWR & LGT	MONTROSE	150,523	0.5%	
29	ONTARIO	ONTARIO HYDRO	LAMBTON	149,774	0.5%	*
30	ONTARIO	ONTARIO HYDRO	NANTICOKE	144,000	0.5%	*
31	OHIO	CLEVELAND ELEC ILLUM CO	EASTLAKE	143,724	0.5%	
32	ILLINOIS	CENTRAL ILL PUBLIC SER CO	COFFEEN	142,870	0.5%	
33	FLORIDA	TAMPA ELECTRIC CO	BIG BEND	142,687	0.5%	
34	W. VIRGINIA	OHIO POWER CO	KAMMER	138,812	0.5%	
35	PENNSYLVANIA	PENNSYLVANIA ELEC CO	KEYSTONE JO	132,325	0.5%	
36	PENNSYLVANIA	PENNSYLVANIA PWR & LGT	BRUNNER ISL	129,202	0.4%	
37	TENNESSEE	TENNESSEE VALLEY AUTH	GALLATIN	127,588	0.4%	
38	OHIO	OHIO EDISON CO	W H SAMMIS	127,509	0.4%	
39	MISSOURI	ASSOCIATED ELEC COOP	THOMAS HILL	126,767	0.4%	
40	TENNESSEE	TENNESSEE VALLEY AUTH	JOHNSONVILE	125,696	0.4%	
41	ONTARIO	FALCONBRIDGE		123,333	0.4%	*
42	ALABAMA	TENNESSEE VALLEY AUTH	COLBERT	117,663	0.4%	
43	OHIO	CARDINAL OPERATING CO	CARDINAL	115,210	0.4%	
44	INDIANA	PUBLIC SERV CO OF IND INC	CAYUGA	107,354	0.4%	
45	ARIZONA	ASARCO INC	HAYDEN PLANT	107,023	0.4%	
46	OHIO	DAYTON PWR & LGT CO	J M STUART	106,518	0.4%	
47	ARIZONA	MAGMA COPPER SMELTER	SAN MANUEL	104,028	0.4%	
48	WASHINGTON	ASARCO INC		103,762	0.4%	
49	PENNSYLVANIA	PENNSYLVANIA PWR & LGT CO	MONTOUR	101,855	0.4%	
50	ARIZONA	PHELPS DODGE CORP	MORENCI	101,196	0.3%	
			TOTAL 50 MAJOR SOURCES:	9,735,467	33.5%	

SOURCE: NAPAP V.S. EPS and MOE data.

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NOTES ON FRED EMISSIONS AND EPS ESTIMATES FOR ONTARIO

The Fast Reference Emission Document - FRED(*) consists of Ontario data extracted from MOE emission data bases and other areas from Canadian and US inventories. One of the main sources quoted for the other provinces of Canada is EPS, which also contains Ontario information. A comparison between MOE and EPS Ontario estimates is thus necessary. In general, good agreement was observed for the base year 1985. The difference between the two sources for the total provincial emissions usually is about five percent for SO2, NOx and VOC. Higher discrepancies, however, exist with CO and particulates in a number of instances.

The more significant differences in CO and particulate emissions usually come from sectors such as slash burning and open sources. For example, the reason for the difference in slash burning may be the approaches employed by EPS and MOE. EPS method uses the general data of primary forest production and conversion factor of 1 tonne of burned materials per 63,052 cubic metre of production. This is fast and more convenient for the purpose of the national inventory, for which the same procedure for data applicable to all provinces is desirable. MOE approach uses the Ontario Ministry of Natural Resources data, which provides actual size and location of the prescribed fires each year. The burned areas are further integrated in the MOE grid system after being converted to material tonnage by a factor of 22 gs/Ha as proposed in a report by Ontario Research Foundation.

EPS also includes several open sources such as agricultural activities (tilling, pesticides etc.), paved and unpaved roads. These sectors contain great uncertainties and are not included in MOE inventories for the time being. It is difficult to gather accurate statistics for these sources, and the related methodologies as well as emission factors still need to be improved before implemetation to the current MOE grid system can be possible. These subjects will be addressed and resolved in the furture.

(*) V.1 - Final Version for Fall 1989.